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Local Strategies for Groundwater Management
Briley Township, Montmorency County, Michigan

Northeast Michigan Council of Governments
Gaylord

Prepared for

Michigan Dept. of Natural Resources, Lansing

Dec 81

U.S. Department of Commerce
National Technical Information Service
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LOCAL STRATEGIES
for
GROUNDWATER MANAGEMENT

PROJECT AREA:

BRILEY TOWNSHIP,
MONTMORENCY COUNTY, MICHIGAN

PREPARED BY:

NORTHEAST MICHIGAN
COUNCIL OF GOVERNMENTS

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Atlanta is an unincorporated community in Briley Township. The community relies solely on individual water wells and septic systems. Hydrocarbons have been detected in the community's water supplies making them unsafe to drink. The pollutants are coming from small sources of unknown location.

The strategy includes the following tasks:

I. Conduct assessments of the problems to be studied
    a. Identify the threats to groundwater quality which need to be prevented
    b. Assess the ability of local ordinances and agencies to prevent the threats
II. Generate options for preventing groundwater contamination
III. Promote consideration of the options by local officials and the public
IV. Evaluate progress toward increasing the protection of groundwater

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Development of a

GROUNDWATER MANAGEMENT STRATEGY

for Briley Township,

Montmorency County, Michigan

Prepared by the

Northeast Michigan Council of Governments

December 1981

for the

Michigan Department of Natural Resources

and the

Briley Township Board

TABLE OF CONTENTS

Page

Acknowledgments i
General Conclusions ii
Section 1: Project Background 1
Section 2: Description of Study Area 3
Section 3: Problem Description 7
Section 4: Residential Survey of Atlanta 11
Section 5: Management Considerations 15
    Transportation, Storage and Handling of Hazardous Waste 17
    Recycling Used Motor Oil 21
    Potential Groundwater Contamination from Solid Waste Landfills and Dumps 23
    On-Site Wastewater Treatment 26
    Septage Disposal 28
    Non-residential Groundwater Discharge Facilities 29
    Potential Contamination from the Storage of Petroleum Fuels 32
    Indiscriminate Disposal of Small Quantities of Hazardous or Harmful Wastes from Households and Small Businesses 53
Section 6: Education Program 61
Section 7: Recommended Management Strategy 63

Appendices

Appendix A: Working Papers and Draft Ordinance on Small Quantities of Hazardous Waste A-1
Appendix B: Working Paper - Potential Groundwater Contamination Problems Associated with Gasoline Service Stations B-1
Appendix C: Preliminary Analysis of Existing Groundwater Management System for Atlanta, Michigan C-1
Appendix D: Atlanta Residential Survey-Questionnaire and Results D-1
Appendix E: Atlanta Commercial Survey E-1
Appendix F: State of Michigan Groundwater Rules F-1

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GENERAL CONCLUSIONS

1) The existing and potential future groundwater problems in Briley Township are the result of 1) an extremely vulnerable potable aquifer in the Atlanta area and, 2) numerous activities, common to similar communities, which allow harmful substances to enter the ground.

2) The storage of petroleum fuels and related activities are primarily responsible for existing contamination problems most likely resulting from multiple incidents and multiple sites.

3) State regulations and enforcement efforts are geared more towards large polluters of groundwater and thus are insufficient to control the types and sources of contamination in Briley Township.

4) Local efforts at groundwater protection are for the most part non-existent or ineffective on a comprehensive basis.

5) The Township has the legal authority to undertake numerous activities, ranging from local ordinances to increased coordination with other agencies, which can greatly reduce the potential for future groundwater contamination problems.

6) Residents of Briley Township are concerned with the issue of groundwater protection and believe that the Township should take an active role in the issue.

7) The disposal of small quantities of hazardous wastes by individuals and small business poses a real threat to the quality of groundwater in Briley Township.

8) Public education regarding individual and community roles in protecting drinking water supplies is a vital and necessary component of any local management program.

9) The Briley Township Board should retain the local advisory committee they appointed to continue to advise the Township in implementing the recommendations and findings contained in this report.

SECTION 1: PROJECT BACKGROUND

208 Water Quality Management Program

Section 208 of the Federal Water Pollution Control Act, passed by Congress in 1972, mandated that Water Quality Management Plans be developed throughout the nation. In Michigan, the Governor delegated the original responsibility of preparing the plans to the fourteen regional planning agencies. The Northeast Michigan Council of Governments began the planning process in 1976 and completed the plan for the region in 1979. The Plan was adopted by the eight counties of Northeast Michigan and received approval from the Governor and certification by the U.S. Environmental Protection Agency. The plan included recommendations and guidelines for the protection, enhancement and preservation of both groundwater and surface waters of the region. Also in 1979, the State of Michigan Department of Natural Resources began development of a statewide water quality management plan which would uniformly include the plans produced by the fourteen regional planning agencies.

State Groundwater Strategy

One of the major issues at the state level which needed to be addressed by the State's planning process was groundwater management. A special grant received from the U.S. Environmental Protection Agency enabled the DNR to thoroughly investigate the problems within existing groundwater management mechanisms and to develop new strategies which will provide the State's plan with a viable groundwater management scenario. As well as the work effort undertaken at the State level in addressing groundwater issues, four local projects were also developed.

NEMCOG's Involvement

In response to a Request-For-Proposal from the DNR regarding the development of local groundwater management strategies, NEMCOG prepared a project proposal concentrating on the recent problems which had arisen in Briley Township, Montmorency County. The DNR accepted NEMCOG's proposal and awarded a grant for the project.

Project Objectives

Because Briley Township is very rural, and yet was experiencing the consequences of serious groundwater contamination problems, the opportunity was present to investigate the types of problems which can develop in areas absent of the more traditional industrial pollution sources. All feasible sources of rural and small community (Atlanta) groundwater contamination were to be thoroughly investigated and management alternatives developed. The results of this intensive study are fully documented in the following chapters of this report.

SECTION 2: DESCRIPTION OF STUDY AREA

Briley Township is centrally located in Montmorency County, Michigan and covers two geographical townships (see Figures 1 and 2) The character of Briley Township is dominated by vast second growth forests and numerous lakes and streams. Two state trunk lines, M-32 and M-33, intersect in Atlanta, the townships population center. The 1980 census results show Briley Township's population to be 1703. Although the community of Atlanta is not incorporated as a village or city, it is the Montmorency County Seat and has a population of approximately 400-500.

Similar to most areas in northern Michigan, lumbering was responsible for Briley Township's early growth. Atlanta was founded in the early 1880's on a newly constructed road between Alpena and Traverse City, which is now state trunk line M-32. Today, growth in Briley Township is due to the increase in demand for recreational and seasonal homes. Presently, there are no manufacturing industries in the township and employment is divided among local and state government offices, the wood products industry, and local services to accommodate seasonal, transient and permanent residents. Unemployment in Montmorency County in early 1981 averaged over 30% with unofficial rates for Briley Township estimated at over 40%. Landuse figures for the township show only 2% being used for residential, 4% for agriculture, less than 1% for both industry and commercial services, and the rest as undeveloped land. State owned forests account for over 35% of the Township's land area. Most of the residential development is concentrated in Atlanta, along the numerous lakes and streams, and along the major transportation routes, M-32 and M-33.

The surface geology of the area is a result of glacial activity some 10,000 years ago which left the land surface a mixture of different soils and relief formations. Depth of glacial drift in the township increases from just under 300 feet in the northeast corner to nearly 600 feet in the southwest corner. Elevations within the township range from 670 to 1300 feet above sea level. Soils are predominately Rubicon-Grayling sands in the upland areas with organic soils found along the drainage courses of lakes and streams. However, the glacial deposits which formed this area of lake beds and moraines

FIGURE 1: LOCATION OF STUDY AREA

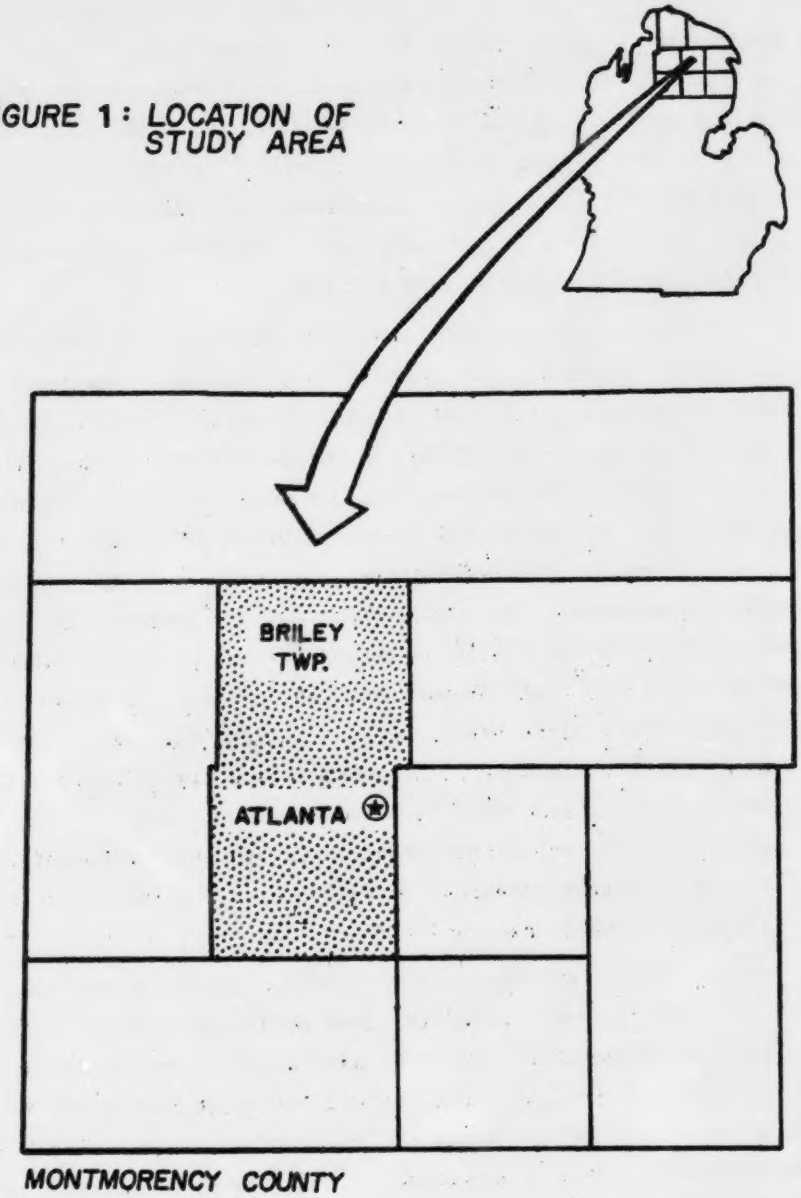
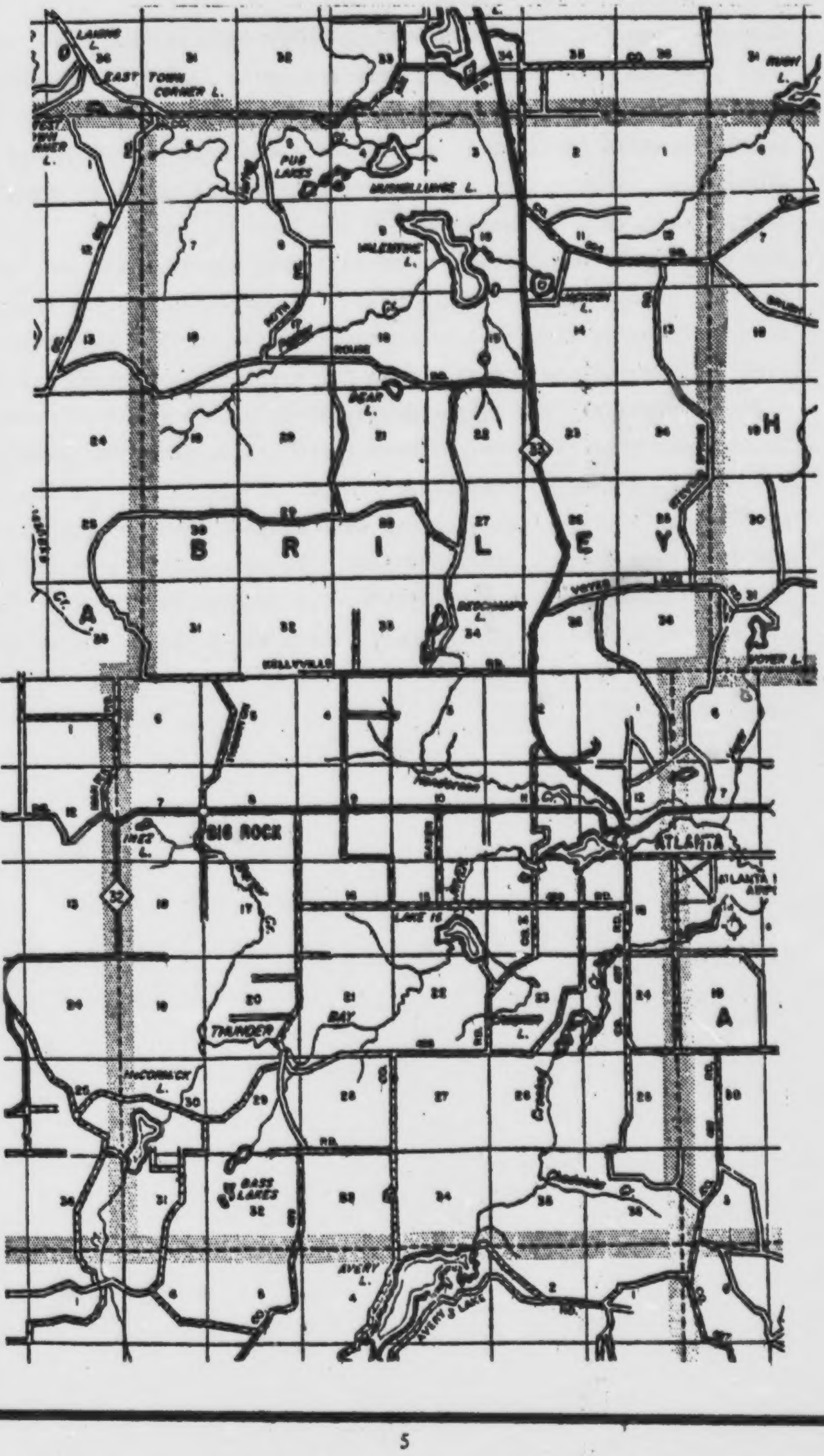

BRILEY TWP.
ATLANTA
MONTMORENCY COUNTY

FIGURE 2: BRILEY TOWNSHIP STUDY AREA
MONTMORENCY COUNTY, MICHIGAN


LANING L.
EAST TOWN CORNER L.
PUG LAKES
MUSKELLUNGE L.
VALENTINE L.
BEAR L.
B R I L E Y
H
A
33
32
BIG ROCK
INEZ L.
ATLANTA
LAKE 15
THUNDER
BAY
McCORMICK L.
BASS LAKES
AVERY L.
AVERY'S LAKE
A

also provided for numerous pockets of more diverse soil associations. Well logs show the existence of subsurface clay in some areas which may provide for limited aquifer protection from surface activities but clay in the Atlanta area is scattered in the form of small lenses and generally does not provide adequate protection. Groundwater is abundant in its availability throughout the Township. Depth to groundwater within the Township ranges from zero feet at the edge of surface water features to well over 100 feet and perhaps as much as 200 feet in the upland morainic areas. No detailed aquifer mapping has been done to describe the total groundwater system for the Township. The surficial features of the Township make for surface drainage to two different major watersheds. The southern two-thirds of the Township drain into the Thunder Bay River and the northern third drains into the Black River system of the Cheboygan River watershed. Depth to groundwater in the Atlanta area ranges from 0 to 25 feet with the same aquifer used for potable water extending down into the till over 200 feet. Potable aquifers in the Township are primarily those nearest the surface. It is doubtful that any fully protected or isolated usable aquifers exist within the Township due to the heterogeneity of subsurface soil formations. The aquifer system is generally classified as leaky artesian.

SECTION 3: PROBLEM DESCRIPTION

A survey undertaken by District Health Department #4 in 1974 in the Atlanta area described the poor conditions existing with regards to on-site wastewater treatment systems and individual water supplies. Approximately 70% of the buildings in the immediate Atlanta area were included in the survey. Results showed that 65% of the sewage systems in Atlanta were septic tanks with dry wells and 30% septic tanks with tile drain fields. A large number of septic tanks were found to be constructed of metal while others were of concrete. Concern over the potential for metal septic tanks to corrode and develop leaks was expressed. Many of the individual wells were of the shallow hand-driven type using casings of less than 2" in diameter. The observed and estimated shallowness of a large majority of wells along with the lack of proper isolation from sewage systems was expressed as the major concern for the safety and health of Atlanta's residents. Many of the identified problems were predictable and expected because of the age of most homes and businesses, small lot sizes, sandy soils and shallow groundwater. Water samples taken from wells included in the survey revealed that only two wells were found to be bacteriologically impure. The fact that only two wells showed high coliform counts was surprising to the health department given the poor site conditions. However, the report pointed out that because the potential for contamination is high, a one-time sampling result would not give a conclusive indication of how water quality may change from day to day. No well samples showed nitrate levels in excess of suggested safe levels (10 mg/l N). Many wells showed excessively high levels of iron, up to 20 mg/l, and hardness was commonly found to be greater than 300 mg/l as $CaCO_3$. Phenol was positively identified in at least one well in the business district of Atlanta while it was suspected in three other wells not tested. The presence of phenol, a chemical not normally associated with domestic use, was a prime example of the vulnerability of the shallow unprotected water supply serving Atlanta. As a result of the findings of the survey, the Health Department recommended that Briley Township pursue a municipal water supply system to alleviate the immediate health hazards. The study also recommended municipal wastewater treatment, especially for the downtown commercial area.

The next notable sampling efforts by the Health Department for which results are available, were in the summer of 1977. Complaints by residents that well water was smelling like gasoline prompted the examination of four wells. Results showed the presence of methane in all four wells and traces of gasoline or gasoline like hydrocarbons in two wells. Phenol was also present in one well. Laboratory capabilities at this time were not sophisticated enough to determine quantities or to identify light organics in the parts-per-billion range.

Sampling was undertaken in the summer of 1979 and was once again the result of local complaints concerning foul smelling water. Between June 1979 and February 1980, 64 samples were analyzed from approximately 50 wells. During this period, laboratory methods improved significantly with the use of GC/MS procedures resulting in very low detectable limits for numerous organics. A total of 12 wells, including 3 non-community public water supplies, 4 residential and 5 commercial wells, were found to be contaminated. Benzene was common to all of the wells found contaminated, while toluene and xylenes were present in all but three wells. Two wells were also found to contain traces of 1,1 dichloroethane, 1,2 dichloroethane, and 1,1,1 trichloroethane. In January 1980, the Health Department issued a warning to residents in Atlanta not to use their wells for drinking or cooking purposes because of the possible presence of benzene. The Health Department concentrated their sampling and monitoring efforts on the non-community public water supplies because of their jurisdiction in regulating these establishments. At least two businesses were told to seek a new source of drinking water resulting in the drilling of deeper wells which subsequently were found to be safe.

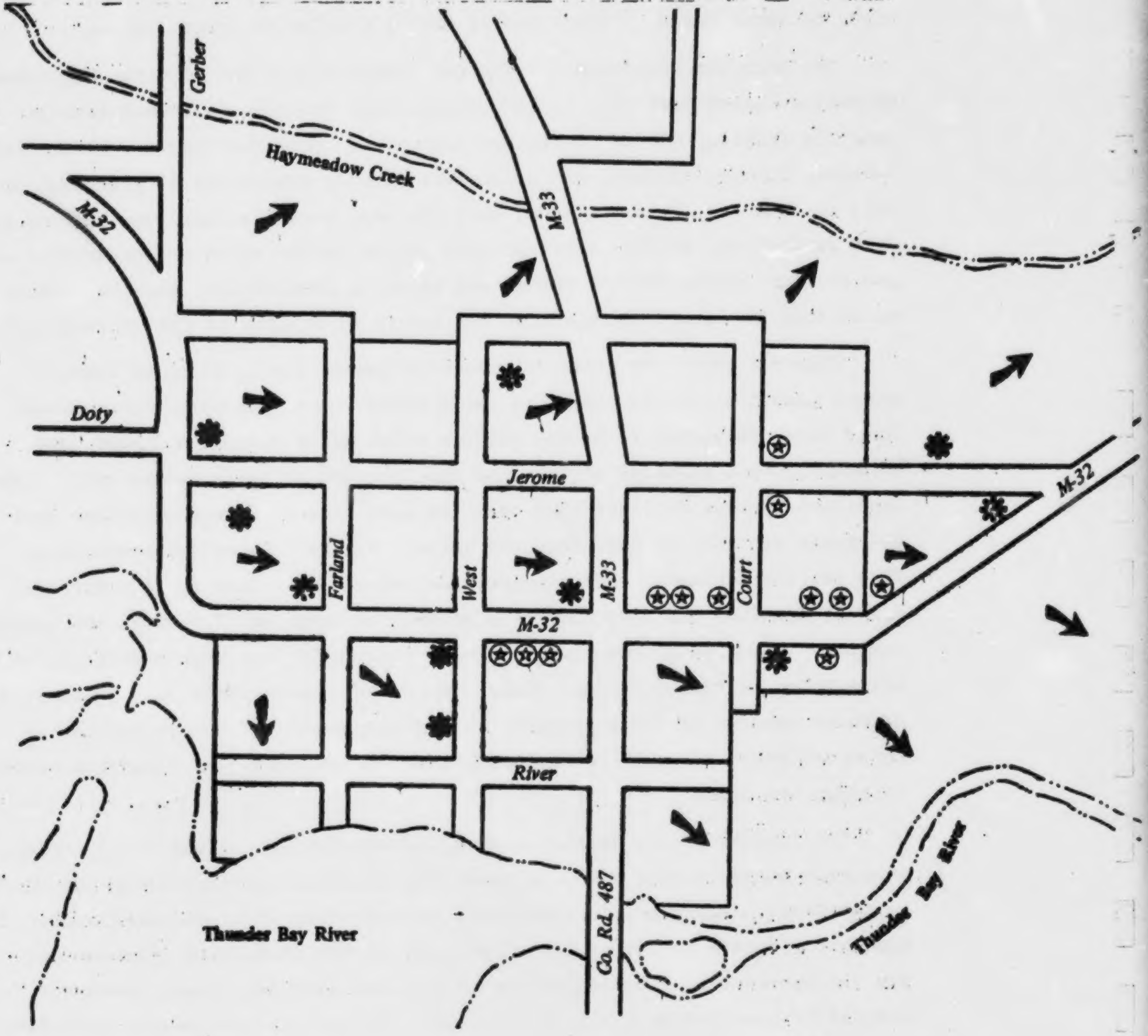
Routine sampling of non-community public water supplies and other selected wells since February 1980 has not revealed any new contaminated wells. No wells outside of an area bounded by M-32 on the west, the Thunder Bay River on the south, and Haymeadow Creek on the north and east were ever found to be contaminated. The philosophy of the Health Department since early 1980 has been that a serious problem of undetermined magnitude was identified in downtown Atlanta and therefore a public water supply system is the most cost effective measure of insuring safe drinking water for the community. Because of this stance, resampling of private wells known to have been contaminated has not occurred. It was felt that should resampling show a well that previously was shown to be contaminated was now testing as uncontaminated, that the results might be interpreted by towns people that a problem no longer exists.

The Michigan Department of Natural Resources and the Michigan Department of Public Health made several site inspections and cursory investigations into the problem, but no conclusive sources of contamination were identified. Because benzene, toluene, and xylene are primary components of gasoline, as well as fuel oil, it was assumed that the most probable cause was leaking gasoline or fuel oil storage tanks or past spills on the surface. Interviews with gas station owners did not reveal any existing identifiable sources. There was no attempt to definitely pinpoint the origin or origins of the contamination.

Figure 3 shows the affected area of Atlanta, the location of below-ground gasoline storage tanks and those wells which have been contaminated. There does not appear to be any pattern which might suggest a direct link between any one gasoline station and the location of contaminated wells. Unconfirmed reports indicate that over the past decade, several stations have had tanks replaced or have detected leaks.* Figure 3 shows the groundwater flow pattern estimated from topographical maps. Well logs for the affected area do not show the existence of a protective layer of clay above the potable aquifer. Depth to groundwater ranges from 0 to 20 feet with a majority of wells being in the 20-30 foot range. An attempt was made by John Steward, a graduate student at the University of Michigan School of Public Health, to correlate depth of wells to contamination. No detectable or significant correlation was found.

The finding of 1,1-dichloroethane, 1,2-dichloroethane and 1,1,1,-trichloroethane suggests that a source other than gasoline is responsible for these contaminants. Although dichloroethane is used along with dibromoethane as a gasoline additive to remove lead from engines, the absence of dibromoethane and the presence of trichloroethane in the same sampling result tends to disqualify gasoline as a probable source. The chlorinated ethanes were only found in two wells. One well served a building that used to house a printing operation. However, a search of chemical products presently being used for printing operations at the Montmorency County Tribune, did not find these chlorinated ethanes as a labeled component. The other well services a craft shop which was formerly a used furniture shop. Personal interviews indicated that furniture stripping was not a part of the previous business.

FIGURE 3 : Underground Storage Tanks, Groundwater Flow and Contaminated Wells in Atlanta, Michigan



Gerber
Haymeadow Creek
M-32
M-33
Doty
Jerome
Farland
West
M-33
Court
M-32
M-32
River
Co. Rd. 487
Thunder Bay River
Thunder Bay River

KEY

✱ – Underground Gasoline Storage Tanks

⊛ – Contaminated Wells

➚ – Groundwater Flow

/

SECTION 4: RESIDENTIAL SURVEY OF ATLANTA

During the later part of May and early June 1981 a door-to-door survey was conducted of households in the Atlanta area. The purpose of the survey was twofold. One, data was needed on household activities and water and wastewater systems in order to determine potential collective and individual impacts on groundwater. Two, public opinion and response to the existing problem and future management changes was vital in developing realistic and viable management strategies. The results of this survey were used by the local advisory committee and NEMCOG staff in determining the direction of certain planning activities.

In order to obtain as much useful information as possible without biasing or intimidating responses from household residents, three local people were employed to undertake the surveys. Having interviewers with local knowledge and acceptance, enhanced the quality and openness of the responses, especially from many of the elderly households. Having local interviewers also improved the efficiency of the survey because of their greater flexibility in reaching certain households at odd hours.

The Atlanta area was divided into four subareas (See Figure 4) with the greatest emphasis placed on reaching a high percentage of households in subarea 1, the affected area of downtown Atlanta. Approximately 60% of the households in subarea 1 were reached and consented to an interview. Between 18% and 25% of the homes in subareas 2, 3 and 4 were included in the survey. Each interview was kept anonymous except for a household numbering system used to avoid duplication by interviewers and to separate interviews from different subareas. Appendix D contains a copy of the survey used and a summary sheet showing the results and a brief statistical analysis of the responses broken down by subarea.

The following results are considered to be the more salient with regards to understanding local activities and opinions concerning the groundwater contamination problem and possible management strategies.

1) In subarea 1, 25% of the residents have discontinued using their individual wells as a source of potable water since the Health Department advised against such use in January 1980.

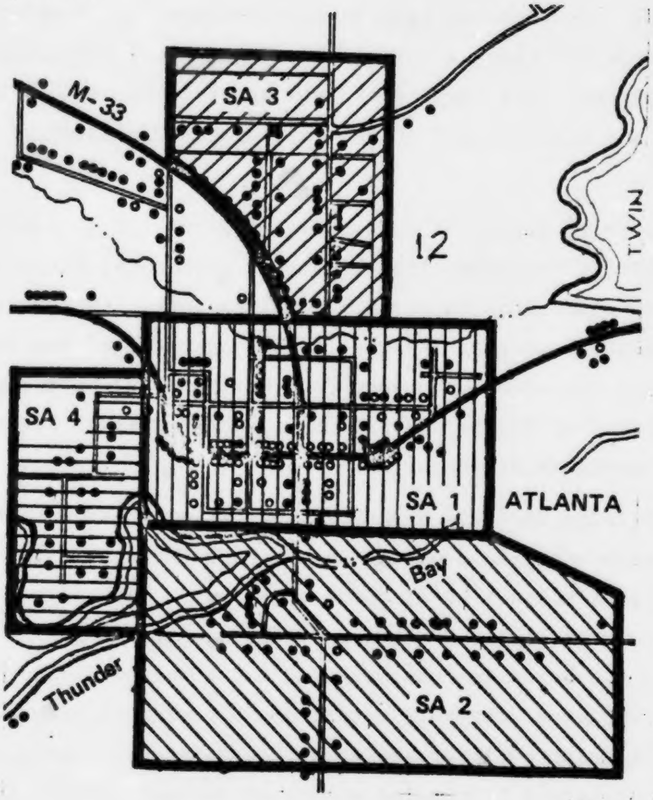

M-33
SA 3
12
TWIN
SA 4
SA 1
ATLANTA
Bay
Thunder
SA 2

FIGURE 4: DELINEATION OF SURVEY SUBAREAS

2) Thirty-three percent of households in the entire survey area responded that they have had taste or odor problems with their wellwater.

3) Approximately 40% of homeowners change their own motor oil. The disposal methods employed for used oil in order of use are: burn it, dump in yard, take to landfill, reuse it, give it away, take to a gas station.

4) Between 10% and 20%, depending on the type of waste, responded that they do have to dispose of harmful wastes such as spent fuels, paint thinners, pesticides, or varnish removers.

5) Over 80% of all households surveyed indicated that they were concerned with the groundwater contamination in Atlanta. There was little variability between subareas and their responses to this question.

6) Nearly half of all those surveyed responded that they felt they had not been kept well informed of the groundwater problems of the community.

7) Over 80% of those surveyed responded that they would utilize a central collection site in the Township for disposing of harmful household wastes. Seventy percent said they would do so even if there were a small charge.

8) Nearly 90% of the respondees indicated that they felt there should be a Township ordinance banning all dumping of harmful or hazardous wastes by individuals or businesses.

The results of the survey indicated that there was strong support for preventing groundwater pollution from all sources. The fact that individuals were willing to participate in management programs such as a hazardous waste collection system, points to the concern that is present within the community. A further item of encouragement was the positive response to local regulatory action by way of a Township ordinance. This response was not expected in light of the general mood in rural northern Michigan of there already being to many controls, regulations and requirements in government. These positive responses may also be interpreted as an indication that public education and information programs may be particularly successful. Informal responses from the interviewers indicated that most individuals were unaware of the dangers posed by disposal of certain household products.

Another observation which should be mentioned is that the responses to questions regarding household product use and disposal may be a poor indication of what happens in other areas of the Township or other communities. This results from the greater than normal population of elderly households in the Atlanta area (no statistics available) which tend to rely more on the service industry of the area to accomplish household and transportation related improvements or repairs.

SECTION 5: MANAGEMENT CONSIDERATIONS

Groundwater management undertaken on a comprehensive, community wide scale is a new field. Consequently there are few examples upon which to base management recommendations. This section will attempt to briefly outline the potential, and existing, sources of groundwater contamination within the Township, and the methodologies which can be used to address those problems. Potential problem identification involves describing a practice or activity, potential or real, which involves the discharge, dumping, spilling, leaking or disposal of a contaminant into or onto the ground. Each potential problem can then be prioritized as to its potential impact on the community's water supply based upon the severity and quantity of the contaminants involved, location of activity, relative occurrence of the activity and the existing controls which affect or regulate the activity. Planning for future circumstances that might lead to a problem is also a management consideration. The following format will be used to describe specific and generic problems and their associated management strategies:

Management Consideration: A short descriptive title of the problem.

Problem Description: A detailed description of the nature of the problem and how it is or may be affecting groundwater in Briley Township.

Existing Management Efforts: A discussion of existing applicable Federal, State and local laws, responsible parties and an analysis of their effectiveness.

Management Alternatives: Alternatives for dealing with the problem from the local and statewide perspective.

The preliminary work which was necessary in order to obtain an understanding of the many diverse problems in the Township, took many forms. First a thorough review of the existing contamination problem was undertaken with the help of the local Health Department and the Department of Natural Resources. A literature search of similar problems in other areas of the State and across the country was attempted, resulting in only a few useful reports. A local advisory committee was established, comprised of local officials, businessmen and citizens, to help in defining local problems, attitudes and desires. A door to door residential survey (see Appendix D for results) in the Atlanta area was completed which provided extensive information on local attitudes and on household activities which may be connected to groundwater problems. A similar survey was undertaken to interview businesses in the area with special attention paid to gasoline service stations. In addition to these surveys, a cursory inventory was made of consumer products available at retail stores which contain critical materials in substantial quantities. Results from each of these information gathering activities are included in the individual problem assessments.

MANAGEMENT CONSIDERATION: Transportation, Storage and Handling of Hazardous Materials

Problem Description: Manufacturing and industrial processes often include the use of or production of chemicals which are potentially hazardous to groundwater should accidental spills or leaks occur. Problems can also be associated with the transportation of hazardous materials to or from the manufacturing site by way of roads and railways. At the present time there are no manufacturing sites in Briley Township which use or produce chemicals included on the Michigan Critical Materials Registry. However, because two major trunk lines, M-32 and M-33, for Northeast Michigan are within Briley Township, it is reasonable to assume that critical materials are being transported on a regular basis through the Township. Included in this category is the storage and transporting of hazardous wastes managed under Act 64 of 1978.

Existing Management Efforts: There are no local preventive management efforts in the form of regulations, review or monitoring. The DNR and the State Fire Marshal have several responsibilities in the area of hazardous materials control. Those responsibilities are outlined below.

1. Under the Part 9 Rules of the Water Resources Commission, all dischargers of wastewater from industrial or commercial processes must report to the Commission any use of hazardous materials which are included on the Michigan Critical Materials Register.
2. Under the Part 5 Rules of the Water Resources Commission, all users of substances contained on the Michigan Critical Materials Register must submit Pollution Incident Prevention Plans (PIPP) to the DNR. All spills or leaks of critical materials must be reported to the DNR within 24 hours.
3. Under Act 64 of 1979, the Hazardous Waste Management Act, all generators of hazardous wastes in excess of 100 kilograms/month are required to be registered as a generator with the DNR and must manifest the disposal of all hazardous wastes.
4. Also under Act 64, all transporters of hazardous wastes must be licensed by the DNR. The hauler must use a vehicle licensed for hazardous waste hauling. The hauler is required to manifest the wastes from the generator and provide the manifest to the disposal site.
5. Under Act 136 of 1969, the Liquid Industrial Wastes Act, all vehicles used to transport liquid wastes must be licensed to do so.

6. Under the Michigan Fire Prevention Code and the Michigan Flammable Liquids Regulations, facilities which store large quantities of flammable liquids must meet certain minimum criteria. Tanker trucks which haul flammable liquids must be approved and licensed by the State Fire Marshal.

The requirements in the Part 5 Rules for Pollution Incident Prevention Plans have not been comprehensively applied or enforced by the DNR. There are thousands of businesses in Michigan which theoretically require the development of PIPP Plans, however, many are not aware of the requirement while many others have prepared plans which are insufficient or not up-to-date. The DNR does not have the manpower to review all PIPP Plans adequately or to follow up on who has or hasn't submitted a plan. The rules specify that the PIPP Plan must include procedures for preventing pollution, emergency clean-up procedures, and self-monitoring and inventory procedures. In the event of a spill or leak of critical materials the Part 5 Rules require notification of the DNR. The lack of comprehensive coverage of all businesses who use critical materials has probably resulted in many small pollution incidents going unreported.

Facilities which store large quantities of flammable liquids must meet certain requirements of the Michigan Flammable Liquids Regulations. These regulations apply only to liquids with a flash point below 200°F and thus do not include many toxic, poisonous or corrosive liquids. These regulations are enforced by the State Fire Marshal or local Fire Chief and are specifically geared towards preventing fire hazards. County building inspectors have the authority to enforce these regulations in regards to specific performance or construction criteria for the storage of flammable wastes at the time of inspection.

Petroleum fuel storage facilities with a capacity of 40,000 gallons or more must meet the requirements of the Part 5 Rules for developing PIPP Plans and reporting all spills or leaks. Many storage facilities, including most gasoline stations, do not meet the 40,000 gallon minimum and are not required to either prepare PIPP Plans or report spills. This is a serious shortcoming of the existing management structure.

For most spills that occur as the result of accidents during the transportation of hazardous materials, there are no reporting requirements. However, the DNR has established a toll-free 24-hour hotline to receive reports of all pollution incidents. This system, called the Pollution Emergency Alerting System (PEAS), has trained DNR staff attending who can quickly coordinate appropriate clean-up activities and notify local authorities.

Management Alternatives:

For the most part the regulatory and legislative controls for preventing pollution from transporting, storing or using hazardous materials are in place; although, current controls do not directly involve the Township. However, there seems to be ineffective enforcement of existing rules and regulations which results in a greater potential for problems occuring. The following recommendations are aimed at improving the current situation to a point where the Township is more aware and involved and existing regulations are more comprehensively implemented.

1. The Briley Township Planning Commission should through their Zoning Administrator and Building Inspector require specific information pertaining to the use of critical materials and hazardous waste generation prior to zoning approval. The Site Plan Review requirements of the zoning ordinance could be specifically updated to include the following or equivalent wording:

SECTION 1708. SITE PLAN REVIEW
SUBSECTION 3, PART e

> "A complete description of any materials to be used, stored, produced or disposed of which are classified as critical materials under the Michigan Critical Materials Register or as hazardous waste under the Michigan Hazardous Waste Management Act (Act 64, P.A. of 1979). Included in this description shall be details of how these materials are stored and the measures which are to be utilized to prevent leaks, spills or other incidents which might pollute surface or groundwaters. Facilities which require a Pollution Incident Prevention Plan (PIPP) under the Part 5 Rules of Act 245, P.A. of 1929 must submit an approved PIPP to the Planning Commission prior to occupancy."

These same provisions could be incorporated into site plan review procedures without explicitly altering the existing ordinance. The requirement for submittal of an approved PIPP will help the DNR in identifying new businesses which require such a permit.

2. The Township should make a formal request to the DNR that all transportation spills or violations of PIPP Plans are reported in writing to the Township. The Township in turn should notify the local Health Department (if they weren't involved in the investigation) of all spills or accidents and the Township Planning Commission of PIPP violations.

3. On an annual basis the Township should request from the DNR a listing of Township businesses with PIPP Plans and those that are hazardous waste

generators. This list should be reviewed by the Planning Commission to ensure that both the DNR and the Township are in agreement as to current activities within the Township. This double-checking will benefit both the Township and the DNR. Any anomolies should be reported to the DNR.

In addition to increased local activity, it is also recommended that the State undertake increased efforts to reach all businesses which are regulated under the Part 5 Rules and determine whether they have fulfilled their legal requirements.

MANAGEMENT CONSIDERATION: Recycling of Used Motor Oil

Problem Description: Unlike other liquid waste of households and businesses, used motor oil is a valuable substance. The oil can be reused or recycled, with relative ease, instead of dumping it in the driveway or backyard. With the implementation of the Hazardous Waste Management Act in spring of 1981, road oiling using used motor oil is almost entirely prohibited. Only if the oil can meet stringent requirements limiting the amount of lead, zinc and chromium is it permitted for road application/dust control purposes. The increase in prices of crude and refined oil over the past decade has made oil recycling a profitable enterprise. Waste oil collection businesses are usually willing to pick up oil at local garages or service centers and buy it for $.05-$.30 per gallon. This monetary incentive by itself is usually sufficient for most oil producing enterprises to store their oil and sell it to collectors. However, there currently are no haulers collecting oil in the Atlanta area for recycling purposes. This is due to the lack of an established "bulk" market in the area. Haulers usually require 1000-2000 gallons in a localized area to fill their tanker trucks.

It is estimated that in the immediate Atlanta area, approximately 250 gallons per month of used oil is available from commercial and municipal garages. Another 25-50 gallons per month would be available from households. This total would require only one or two pickups by a waste oil hauler per year. The problem at this time is the lack of storage capacity at local facilities to hold oil for more than a few months at a time making it difficult to have on hand, at any one time, enough oil in the Atlanta area to meet minimum requirements of waste oil haulers. It is unknown where oil presently being picked up in the Atlanta area is going or for what purposes.

Discussion with several of the gasoline station owners indicates an interest and willingness on their part to act as repositories for oil from individuals. However, until a larger market in Montmorency County can be established, there most likely will not be any haulers collecting oil in the Atlanta area for recycling purposes.

Existing Management Efforts:

There are no existing legal requirements for used motor oil to be recycled. Waste oil does fall under the auspices of Act 64 unless it is to be recycled or reused for its initially produced purposes. Transportation of waste oils for disposal must be by a licensed liquid industrial waste hauler. There has been no effort in Montmorency County to develop or establish a used oil recycling program although approximately 30 counties statewide have initiated such a program in the past 18 months.

Management Alternatives:

This problem can be, for the most part, simply resolved through the establishment of a recycling program that would include Briley Township and other communities in Northeast Michigan. The recommended strategy in this case is for some responsible body to take a lead role in organizing such a recycling program. The following are the agencies or organizations which might appropriately serve as the lead organizer: Northeast Michigan Council of Governments, Thunder Bay River Watershed Council and District #4 Health Department. It is recommended that these three organizations convene a meeting to discuss the feasibility of establishing an oil recycling program on a multi-county level.

MANAGEMENT CONSIDERATION: Potential Groundwater Contamination From Solid Waste Landfills and Dumps

Problem Description: Solid waste disposal sites, in general, rank as one of the highest potential groundwater contamination problems in most communities. Numerous cases of contamination have been recorded across the state where municipal or industrial waste disposal sites have leached pollutants into the groundwater. This problem is most severe where toxic or hazardous wastes from industrial sources were in the waste stream. Currently there are no licensed disposal facilities in Briley Township. The Briley Township dump, which operated from 1939 to 1978, is the only known disposal site in the Township. Figure 5 shows the location of the closed dump which has since been covered and turned into a Township recreation area. It is unknown whether any wastes in the dump may be toxic or hazardous in nature. The dump received primarily residential wastes, as well as inert wastes from construction, demolition and land clearing activities. A sanitary landfill that serves Montmorency and Oscoda Counties is located in Loud Township approximately one mile from the south east corner of Briley Township. This site does not pose a threat to any residential areas in Briley Township.

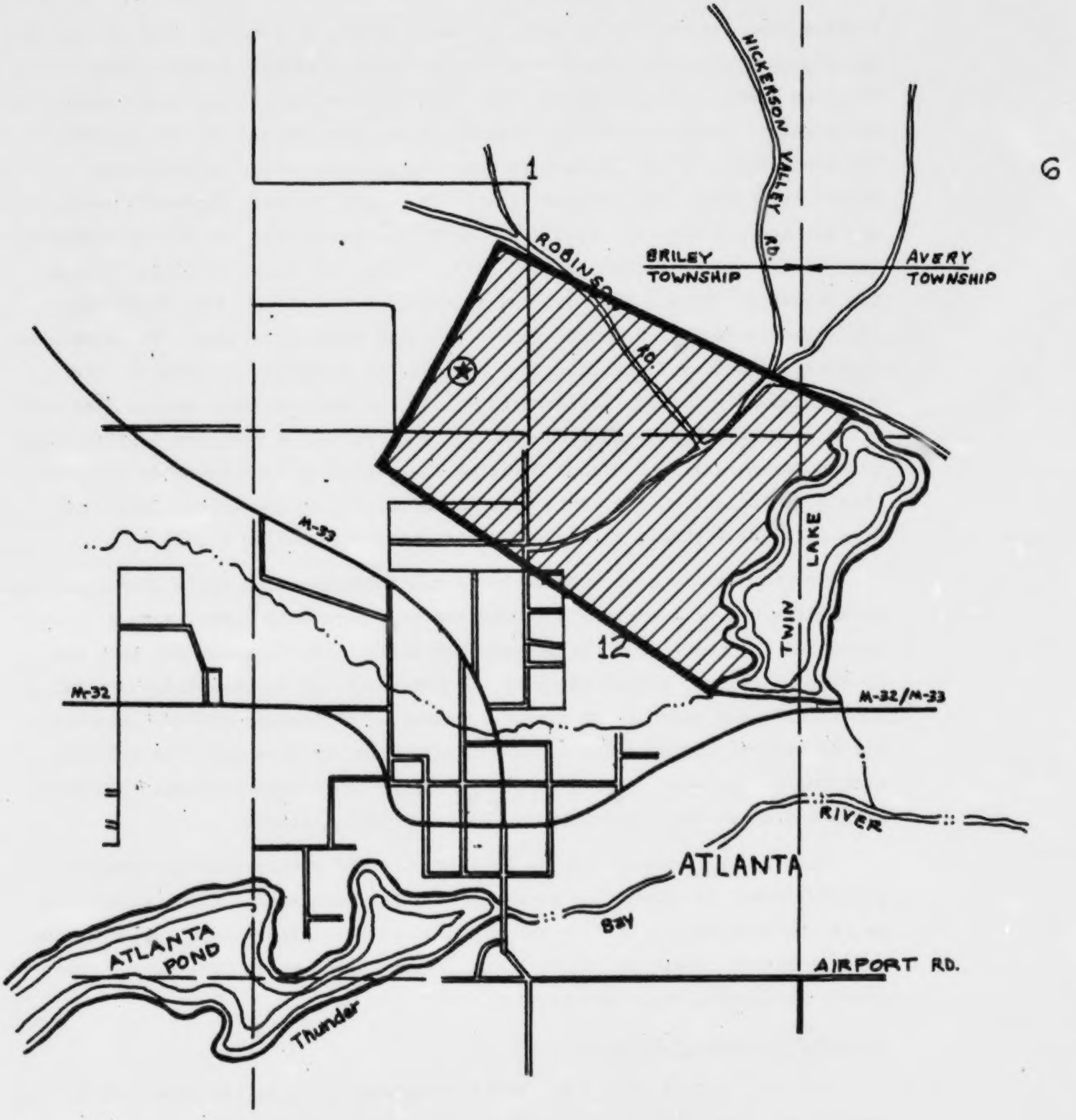
Groundwater is most vulnerable to contamination from waste disposal sites when soils are of a permeable nature and no impermeable layer, such as clay, separates the waste from the groundwater table. Liquid which can seep out of disposal sites, called leachate, is the result of decomposition of wastes and percolating rainfall or runoff. Leachate, containing contaminants which may be present in the landfill, can migrate from the disposal site and move with the groundwater. Potable drinking water wells down-gradient from landfills and dumps are vulnerable to pollution from leachate.

The Briley Township dump is located on a 120 acre parcel of Township property which is classified as a gravelly Roselawn Sand. Groundwater flow is to the east/southeast from the site and surface drainage follows the same general direction via an intermittent stream which enters Twin Lake. There are no monitoring wells at the site.

Existing Management Efforts:

Act 641 of 1978, the Solid Waste Management Act, is the major regulating statute which governs the disposal of solid waste in Michigan. This law requires certain minimum criteria under which landfills can be sited and

FIGURE 5: LOCATION OF BRILEY TOWNSHIP DUMP & POTENTIAL PROBLEM AREA


NICKERSON VALLEY RD.
1
6
ROBINSON RD.
BRILEY TOWNSHIP
AVERY TOWNSHIP
M-33
TWIN LAKE
12
M-32
M-32/M-33
RIVER
ATLANTA
Bay
ATLANTA POND
Thunder
AIRPORT RD.

operated. It is anticipated that the joint Montmorency-Oscoda County Landfill will be licensed under this act when implementation takes place. The twenty year solid waste plan for northeast Michigan, now being finalized, will probably call for continued use of the joint landfill. This will most likely preclude the development of a landfill within the Township in the foreseeable future.

There are no requirements in Act 641 for the investigation or long-term monitoring of closed dumps such as the one in Briley Township. Because there are no known industrial sources of wastes which were disposed of there, the DNR will probably not consider this dump in future monitoring efforts.

Management Alternatives:

The present management system is adequate to protect groundwater resources from impacts resulting from future disposal of solid waste. The potential or existing impact from the Briley Township dump is an unknown at this time. Although the potential for problems arising at this site, because of its isolated location and suspected non-hazardous contents, is low; certain precautions are warranted. First, existing wells located within the area outlined in Figure 5 should be tested for indications of contamination from leachate. Second, any proposed development within this same area should be approved only after consideration is given to the potential for contamination from the dump. And, third, it is recommended that consideration be given to installation of monitoring wells.

MANAGEMENT CONSIDERATION: ONSITE WASTEWATER TREATMENT

PROBLEM DESCRIPTION: A great deal of literature is available reporting the effects of onsite wastewater treatment on groundwater quality. Documentation of similar problems has been provided by the local Health Department for the Atlanta area and the Township as a whole. The combination of below-code systems, sandy soils, high groundwater and insufficient separation of wells and treatment systems are all symptoms and causes of the current problem. Onsite systems are ideally suited for areas with low density housing, loamy sand soils and depth to groundwater greater than 20 feet. Some isolated areas within the township experience system failures because of too heavy of soils resulting in ponding. Although these failures are a public health nuisance, they, in general, are not a potential groundwater contamination problem.

Within Briley Township, problems with onsite treatment are most serious in the downtown Atlanta area and the subdivisions peripheral to Atlanta. The business district along M-32 in Atlanta is a particularly difficult problem. The general lack of space to provide adequate treatment area and the near proximity of systems to neighboring wells is limiting the expansion of the commercial district and has placed a hardship on several existing businesses.

EXISTING MANAGEMENT EFFORTS: The primary responsibility for onsite wastewater treatment lies with the local Health Department. The Montmorency County Health Department is part of District Health Department #4 covering Cheboygan, Presque Isle, Alpena and Montmorency Counties. Their authority comes from Act 306 of the Public Acts of 1927, as amended, which allows for the establishing of regulations affecting public health and sanitation. The sanitary code for District #4 provides specific requirements for the siting and construction of onsite wastewater treatment systems. The code is enforced by a local sanitarian and by the District's Board of Health. Variances and appeals regarding the implementation of the code are referred to the Board of Appeals comprised of the Chairman of the Montmorency County Board of Commissioners, three designated Board of Health members representing Montmorency County and the Township Supervisor of the township in which the appeals situation is located.

The code requires that all new systems, under 10,000 gallons/day, must have a permit approved by the Health Department prior to construction of the system. Theoretically, all systems which have been installed since the code went into effect in 1967 have met the requirements of the code, except those which have been granted variances. Although the code and its implementation do not guarantee that groundwater will be protected from domestic waste, it does provide minimum guidelines which are intended to promote the best methods of treatment and disposal. Two changes to the code have been suggested which would improve its effectiveness. One, the minimum depth to high groundwater should be increased to six feet from the present four feet, and two, there should be some maximum percolation rate established in order to avoid placing systems in very highly permeable soils. Both of these suggestions would serve to minimize the impact of onsite disposal in shallow, highly permeable soils.

The Briley Township Zoning Ordinance also, albeit indirectly, regulates the possible impact of onsite systems. The ordinance requires minimum lot sizes for all new platted lots. The 20,000 sq./ft. minimum does provide for adequate separation of systems and prevents the development of high density residential areas which are prone to domestic groundwater contamination problems. However, the zoning ordinance cannot regulate residential development by way of minimum lot size in areas platted prior to April, 1976. This grandfather exclusion allows development of small lots as long as they meet the setback, separation and sanitary code requirements.

MANAGEMENT ALTERNATIVES

1. Either the sanitary code or the zoning ordinance could be amended to provide more stringent minimum criteria for onsite systems especially with regards to depth to high groundwater (recommended minimum - six feet) and excessive percolation (recommended maximum - ½ minute/inch). Enforcement of more stringent criteria could be limited to areas where residential development is greater than two residences/acre.

2. The Township should continue to pursue a centralized wastewater collection/treatment system for the immediate Atlanta area.

3. The Groundwater Protection Education Program for Briley Township should include information on proper homeowner use and maintenance of onsite systems.

MANAGEMENT CONSIDERATION: Septage Disposal

Problem Description: Septage is a term used to describe wastes from the pumping of septic tanks. A septage disposal area may have a deleterious effect on groundwater if soils are permeable and groundwater is unprotected from surface contamination. Pollutants of concern are nitrogen, in the form of nitrates, and bacteria which may be disease causing; the same concerns as for on-site wastewater treatment. Generally, septic tank pumpers dispose of septage in rural, isolated areas that are approved by the local health department. Disposal sites may be changed every few years depending on size, location and isolation of the site. There are reports from other areas of the State of septage being dumped without permission along roadways and on state land. Illegal dumping does not appear to be a problem in Briley Township. There is one known disposal site located in the Township and used by Dice's Lumber and Building Supply. This site is located in Section 15 T30N R2E west of Lake 15.

Existing Management Efforts: Septic tank pumpers and haulers are required to obtain approval from the county health department for establishing disposal areas. The health department takes into consideration the buffering aspects of a proposed disposal site in terms of groundwater depth and flow and the proximity of households with potable wells. Once a site is approved there is no further investigation by the health department unless problems should arise. Within the DNR, the responsibility of the Emergency Response and Waste Hauler Licensing Section is to see that all persons engaged in the business of servicing or maintaining septic tanks, seepage pits or cesspools within Michigan are duly licensed as mandated by Act 243 of 1951. Inspections of septage disposal sites and vehicles used in such operations are carried out by the County Health Departments and recommmendations forwarded to the Emergency Response and Waste Hauler Licensing Section. The DNR then makes licensing decisions based on local recommendations. Both the vehicles used and each person engaged in the septage hauling and disposal business are required to be licensed.

Management Alternatives: The current method of handling septage disposal appears to be adequate to protect potable water supplies in Briley Township. In order to prevent any future problems which may arise due to residential development on or near abandoned septage disposal sites, the health department should provide the Township Planning Commission information pertaining to past and current septage disposal practices.

MANAGEMENT CONSIDERATION: Non-Residential Groundwater Discharge Facilities

Problem Description: The discharge of wastewater using drainfields, seepage lagoons, irrigation fields, or deep well injection can pose a threat to groundwater quality where precautions are not taken. These disposal mechanisms are commonly used by industrial, commercial and residential developments where municipal sewerage systems are not available. Currently, there is only one facility in the Township which actively discharges non-sanitary wastewater to the ground. This facility, the Atlanta Laundromat, discharges wastewater from coin-operated washing machines to a seepage lagoon on the north side of Haymeadow Creek. An Order of Determination allowing this discharge was approved by the Water Resources Commission in 1962. There has been no further monitoring or investigation of the disposal site by the DNR resulting in a change of the Order of Determination.

At the Essex International plant, west of Atlanta, is a small lagoon which received limited wastewater from production activities. This disposal facility never received a permit for operation from the DNR and subsequently there is no discharge information available. Essex discontinued operations at this facility in 1980. It is anticipated that any new use of this facility which includes the discharge of wastewater, will be required to apply for an operating permit under Act 245.

It is difficult to predict if there will be future industrial, commercial or residential development within the township which will have groundwater discharges. The only proposed project is for a sanitary sewer to serve the immediate Atlanta area. The Facility Plan completed in 1981 recommends a treatment system located at the Atlanta Airport which includes aerated treatment cells, a storage lagoon, and a seepage area. Groundwater flow at this site, actually located in Avery Township, moves from west to east, away from Briley Township. A hydrogeological study of the site revealed that the seepage area cannot hydraulically assimilate the discharged wastes necessitating a series of purge wells to drawdown the water table, intercept any possible contamination problems, and discharge to Crooked Creek, a tributary to the Thunder Bay River. This proposed project will require a groundwater discharge permit and a surface water discharge permit, both from the Department of Natural Resources. Because the site is located outside of Briley Township and the groundwater flow is away from the Township, potential groundwater impacts from this proposed project will not be addressed in detail within this report.

Existing Management Efforts:

Both the local health department and the Department of Natural Resources have responsibilites in regulating wastewater treatment systems which discharge to the ground. The health department's authority is limited to septic systems for private and public use where the discharge of sanitary waste is less than 10,000 gallons/day. All discharges of sanitary waste from public sources requires an Act 98 permit from the DNR and all discharges of sanitary wastes greater than 10,000 gallons/day require a Groundwater Discharge Permit under Act 245 from the DNR. Table 1 illustrates the permit requirements for the discharge of sanitary wastes.

TABLE 1: PERMITS REQUIRED FOR THE DISCHARGE OF SANITARY WASTES TO THE GROUND

	UNDER 10,000 GALLONS/DAY		OVER 10,000 GALLONS/DAY	
PERMIT REQUIRED	PRIVATE	PUBLIC	PRIVATE	PUBLIC
LOCAL HEALTH DEPARTMENT	X	X		
DNR ACT 98		X		X
DNR ACT 245			X	X

All discharges of non-sanitary wastes from commercial or industrial processes require an Act 245 permit from the DNR. This permit system now follows rules adopted in 1980 known as the Part 22 rules of the Water Resources Commission or more simply, the Groundwater Rules. These rules prohibit the degradation of groundwater in usable aquifers and require extensive preliminary study before a discharge permit can be issued. A copy of the Groundwater Rules can be found in Appendix F.

The existing permit processes now in place to regulate wastewater discharges to the ground appear to be adequate to protect groundwater quality from future development. Enforcement of existing rules and permit requirements is necessary to ensure compliance and relieve local government from considering local controls. Communication networks between local government, local health departments, and the DNR can be improved in order to provide more varied input in decision making.

Management Alternatives:

Because the permitting and regulatory activites of the health department and DNR adequately cover the problem, the only role for Briley Township would be in monitoring these activities. It is suggested that all Act 245 groundwater discharge permits be reviewed by the Township and that proof of an approved permit be required by the zoning administrator prior to any zoning approval, for all proposed commercial or industrial development requiring such a permit. Current areas zoned for industrial use do not seem adequate to allow for much additional industrial or commercial growth without rezoning other areas as industrial. Any future changes in zoning districts should reflect a concern for allowing industrial or commercial development, which may require wastewater discharge facilities, near residential areas.

The Township should make a request of the DNR to survey the wastewater discharge practices of the Atlanta Laundromat. The existing Order of Determination was authorized nearly twenty years ago, and recommended disposal practices and groundwater concerns have changed over that period. This request would be a precautionary measure to ensure that the existing disposal system is adequate to protect local water supplies. Additionally, the Township should request the DNR to investigate the lagoon at the now closed Essex International plant site for possible in-place toxics.

MANAGEMENT CONSIDERATION: Potential contamination from the storage of petroleum fuels

Problem Description: In any rural community, there exists numerous facilities for the storage of petroleum fuels, primarily gasoline and heating oil. As a category, these facilities represent one of the greatest concerns to the protection of groundwater quality. It is highly suspect that at least part of the existing contamination problem in Atlanta is the result of activities or accidents which are associated with the storage of gasoline or other fuels. Each gasoline station typically has a capacity of 5-15,000 gallons and bulk storage facilities may have above ground tanks with up to 100,000 gallons of capacity. Other storage facilities, usually with smaller storage capacity, are located at municipal garages, road commissions, airports and large commercial or industrial sites.

Petroleum fuels, particularly gasoline, are a priority concern because of the highly toxic nature of the substance. Gasoline has nearly 200 different hydrocarbon components, many of which are known to be either carcinogens or lesser health hazards. The common components to most gasolines that are of particular concern with respect to groundwater contamination are:

Benzene
Ethyl benzene
N-propylbenzene
Toluene
1, 2, 4 - Trimethylbenzene
1, 2, 5 - Trimethylbenzene
(O,P) xlyene

Benzene, toluene and xylene have all been found in contaminated wells in Atlanta. Benzene is considered the most servere contaminant because it is a known cancer causing agent. In addition to the multitude of gasoline components produced in refining of crude oil to gasoline, are numerous additives which are used to increase the efficiency of the fuel, promote longer engine life and to accomplish a number of other storage and combustion related requirements. Some of the additives which are commonly used and which are of a health concern are:

Dibromoethane
Dichloroethane
Tetraethyllead
Tetramethyllead
Methanol

According to the Department of Natural Resources, most contamination problems involving gasoline are the result of leaks or spills from gasoline storage tanks. Typically, stations in the Atlanta area have 2-6 tanks. Because ownership of most stations in Atlanta has changed hands frequently over the years, it is very difficult to determine an accurate history of storage problems at each facility. The age, exact size, and repair history on storage tanks is generally not known by station owners or managers.

Steel storage tanks, which were predominantly used before fiberglass came on the market, are very susceptible to corrosion. A survey by the American Petroleum Institute revealed that 76% of all categorized tank leaks were the result of corrosion. The older the tank and the longer it has been in the ground increase the possibility of corrosion. With groundwater levels in Atlanta as near as 10 feet below the surface, it is suspected that many existing storage tanks may be in or very nearly in saturated soils. Fiberglass tanks are not as susceptible to corrosive forces but are more prone to physical damage caused by "sticking" or poor installation.

In the past when gas prices were at $ .20-$.30 per gallon, it may have been more economical for stations to tolerate a small leak rather than repair or replace the tank. Today's prices have altered this situation somewhat, but small losses could still be tolerated from a dollars standpoint.

Aside from contamination or fuel losses resulting from leaking storage facilities, many problems occur during the filling of storage tanks. Carelessness during the filling process can cause tanks to overfill and spill on the ground. Approximately 30% of the problems associated with underground storage of petroleum fuels reported to the Pollution Emergency Alerting System in 1979 were the result of accidental spills of this nature.

An additional area of concern is the bulk storage of petroleum fuels above ground. One such site exists just north of Haymeadow Creek in Atlanta.

Above ground storage provides for much easier detection of leaks and thus there is usually little question as to the condition of storage facilities. All storage facilities which have a capacity of greater than 40,000 gallons must have an approved Pollution Incident Prevention Plan (PIPP) from the Michigan Department of Natural Resources as is the case for the above mentioned facility. The requirement for a PIPP comes under the authority of Act 245 of 1929, as amended, known as the Water Resources Commission Act.

There is little known of problems resulting from leaks from residential or commercial fuel oil storage. In Atlanta, as is the case in most rural communities, residential fuel oil storage is predominantely by above ground, steel storage tanks ranging in size from 200-500 gallons. There is, however, approximately 20-30% which are underground including most tanks for commercial buildings. Fuel oil is similar to gasoline in that it is comprised of over 100 different hydrocarbons (including benzene, toluene and xylenes), but it has a higher percentage of heavier hydrocarbons in the C-8 to C-12 range. In Briley Township it is estimated, based on results from the residential survey, that there are approximately 600 residential fuel oil storage tanks. The potential for contamination from fuel oil storage is difficult to assess. Leaks that occur in above ground storage tanks are readily detectable and most individuals would act quickly to rectify the situation. However, as with gasoline storage tanks, small leaks in below ground storage units are difficult to detect and may go unnoticed for months or years. Unlike gasoline storage tanks, though, there is no easy way of monitoring input compared to use.

Existing Management Efforts

Management activities to control groundwater pollution are primarily centered at the State level. Indirectly, there are provisions within the Briley Township Zoning Ordinance which help to prevent contamination of wells from accidents or leaks at gasoline stations or bulk storage facilities. The ordinance does not allow gasoline service stations in areas zoned as residential. This concept of keeping service stations out of residential areas is important, especially in areas of vulnerable aquifers. However, due to the late date at which the zoning ordinance becomes effective, non-conforming land uses were allowed to continue and Atlanta has gasoline stations in or near residential areas. These zoning restrictions are not effective at dealing with existing problem potentials but should provide proper controls over the siting of future development.

At the state level there are two principle laws which indirectly and directly exert some form of protection for groundwater from petroleum fuel storage. They are: Act 207 of 1941, as amended, known as the Michigan Fire Prevention Code and which includes the Michigan Flammable Liquids Regulations; and Act 245 of 1929, as amended, which is the generic water quality protection act in Michigan known as the Water Resources Commission Act.

The Fire Marshal Division of the Michigan Department of State Police has the responsibility for enforcing the Michigan Flammable Liquids Regulations and the Michigan Fire Prevention Code, which "provide for the prevention of fire and protection of persons and property in the transportation, storage, handling, offering, for sale, sale and use of flammable liquids in the State of Michigan...". This includes regulating the location, setting, design, construction and abandonment of fuel storage tanks and associated fixtures and piping. The regulations also cover private storage of flammables in addition to commercial operations. The regulations require notification of an accidential spillage or leakage of "any considerable amount of a flammable liquid in any incorporated area...". The Flammable Liquids Regulations give minimum construction criteria for storage tanks. Again, the criteria are insufficient to address the problem of corrosion and monitoring which are of primary importance in protecting groundwater. While these regulations offer some protection against groundwater contamination, they were designed to prevent fire hazards, and as such, offer limited protection of the groundwater. For example, a fire marshal can require testing of an underground tank only if there is evidence that a leak has caused a fire hazard. Recently proposed changes to these regulations are better geared toward identifying and preventing leaks and spills as they relate to groundwater contamination.

Under the Michigan Flammable Liquids Regulations, underground storage tanks that are no longer being used are considered to be abandoned and are classified into three status categories: temporarily-out-of-use; indefinitely-out-of-use and, permanently-out-of-use. Temporarily-out-of-use tanks are those which are expected to be used again within a relatively short period of time and according to the Regulations must be emptied down to the suction line during its non-use period. Indefinitely-out-of-use tanks are those which exist on unoccupied property or which are not expected to be used in the near future. Indefinitely out-of-use storage tanks must be filled with water to expel all flammable liquids. Permanently-out-of-use tanks are those considered to be of no incidental use to the type of occupancy on the property and are usually not expected to be used again. These tanks are truly abandoned and must be removed or filled with sand. Currently, there are at least four abandoned tanks either classified as Indefinitely-out-of-use or Permanently-out-of-use in Atlanta. At this time, it is unknown what the status of these tanks is. Enforcement of the abandonment requirements does not seem to be very effective because of the lack of reporting requirements by the tank owner to the Fire Marshal. Consequently, the Fire Marshal has no direct way of knowing when tanks are no longer being used and thus enforcement and compliance with the regulations falls short.

There are two important parts of Act 245 and its associated rules relating to fuel storage. First is the 'generic' water quality protection authority which reads as follows:

"It shall be unlawful for any persons directly or indirectly to discharge into the waters of the state, any substance which is or may become injurious to domestic, commercial, industrial, agricultural, recreational, or other uses which are being or may be made of such waters..."

This basically makes it unlawful in the State of Michigan for anyone to pollute groundwater and gives authority to the Department of Natural Resources to take necessary actions to prevent, monitor or investigate pollution problems and to initiate legal action where appropriate. More specific regulations pertaining to petroleum fuel storage are contained in the Part 5 rules governing spillage of oil and polluting materials. However, as stated earlier, the Part 5 rules specifically apply to oil storage facilities (including gasoline) which have on hand, at any one time, in excess of 40,000 gallons. This, in most cases, will exempt a gasoline station or private storage facility from requirements of the Part 5 rules such as development of a pollution incident prevention plan (PIPP) and special reporting criteria.

The following are major problems or shortcomings of the existing management structure to control contamination from petroleum fuel storage facilities.

1. The lack of local management efforts, including knowledge about the number and condition of fuel storage tanks and facilities.
2. The lack of monitoring and reporting requirements under Act 245 or Act 207 for facilities which store less than 40,000 gallons of petroleum fuel.
3. Insufficient construction and materials criteria for storage tanks as a means of preventing future accidents.
4. Ineffective enforcement of the abandonment requirements contained in the Michigan Flammable Liquids Regulations by the State Fire Marshall.

Management Alternatives:

Because of the great lack of specific management efforts at either the local or the state level to prevent groundwater contamination from petroleum fuel storage activities, many alternative approaches may be taken to fill the gap. Alternative A places the bulk of the responsibility at the local level by the development of a specific ordinance to regulate storage activities. Alternative B is directed at updating and amending existing State regulations to more specifically address the problem.

Alternative A: The authority to develop and enforce a local ordinance to protect the public health and welfare of Briley Townships' residents comes from Act 246 of 1945, the General Township Ordinances Act. Under this authority, Briley Township can pass a general law ordinance establishing criteria and performance standards related to the storage of petroleum fuels. The major components of such an ordinance would include the following:

1) A means by which to attain knowledge of the existence, location, use, condition and modification or replacement of all petroleum fuel storage facilities in the Township.
2) An operating permit to be required by all affected facilities for their storage tanks.

3. A requirement for owners of storage facilities to monitor inventory to the best of their ability in order to determine the presence of any losses due to leaks or other accidents. Reporting of monitoring activities and results would be periodically reviewed by the Township or their enforcement representative.
4. The establishment of minimum construction criteria for all new or replaced storage tanks and associated equipment.
5. The authority to require testing or unearthing of tanks suspected to be in poor condition or malfunctioning.
6. The requirement for all detected leaks or spills to be immediately reported to Township authorities as well as to the State's Pollution Emergency Alerting System (PEAS).
7. The requirement for all abandoned tanks to be reported to the Township and the appropriate enforcement body for Act 207 of 1941 being the Michigan Fire Prevention Act.
8. The ability to assess fines and/or punishment as a misdemeanor for violation of the ordinance.

Because current rules and enforcement are sufficient to regulate above ground bulk storage facilities and other facilities where greater than 40,000 gallons are stored, this ordinance would be geared towards affecting those facilities where underground storage is less than 40,000 gallons. Gasoline service stations are the primary focus of such an ordinance as well as other municipal and private storage facilities. It is recommended that below ground fuel oil storage tanks greater than 500 gallons in size also be addressed within such an ordinance.

The enforcement of this type of local ordinance will require manpower, dollars and cooperation from facility owners. Manpower needs are difficult to access, but it is estimated that less than 100 hours per year would be necessary after the initial information base and monitoring system are established. The bulk of the enforcement effort could be incorporated into existing Township responsibilities. The additional expense of enforcement can be recouped through a reasonable operating permit fee. Violations of the ordinance will require legal action most likely through prosecution by the Township's attorney.

Hand in hand with the establishment of such an ordinance must be an attempt to disseminate information to facility owners and the general public regarding the potential problem and measures that can be taken to avert future problems. It is recommended that a seminar on the topic be presented prior to enactment of the ordinance to educate facility owners. A draft ordinance can be found on pages 41 to 48.

Alternative B: This alternative management scenario would concentrate on increasing the enforcement of existing state laws and amending others. The basic authority for the State to increase their regulations on petroleum fuel storage is rooted in the Part 5 Rules of Act 245 and in the Michigan Flammable Liquids Regulations, Act 207 of 1941. Within the framework of these two acts is the establishment of appropriate enforcement and surveillance mechanisms similar to what is needed to address underground petroleum fuel storage problems. The following amendments to these Acts and their rules are recommended under this alternative:

1) Act 245 of 1929, as amended, Part 5 Rules should be expanded to:
    a. include a registration or permitting process for all commercial underground storage facilities of less than 40,000 gallons in capacity.
    b. require daily inventory monitoring with periodical reporting to the appropriate DNR division.
    c. require the reporting of all spills and leaks immediately.
    d. require notification of all modifications or abandonment of storage facilities.
    e. coordinate activities with State Fire Marshal.

2) Act 207 of 1941, as amended, Michigan Flammable Liquids Regulations should be expanded to:

   a. require all new underground storage tanks to be of an equivalent technology to the fiberglass reinforced Clawson STI-P3.
   b. provide authority for the State Fire Marshal to require testing of tanks when there is question as to the tank's integrity due to age, suspected problems or problems occurring in similar type tanks at the same location.
   c. require all existing and newly constructed tanks to have monitoring holes or sniffer tubes to provide for better problem detection.
   d. require all tanks to be equipped with overfill protection.
   e. improve and increase reviews and site inspections of new or replaced storage tank installations.
   f. coordinate activities and exchange information with DNR.

- SAMPLE -

BRILEY TOWNSHIP ORDINANCE

An ordinance to protect groundwater and surface water from leaks and spills of petroleum fuels stored in underground storage facilities.

It is hereby enacted by the Township Board of Briley Township, Montmorency County, Michigan pursuant to the authority granted by Public Act 246 of 1945, an ordinance as follows:

Section 1. Title

Briley Township Ordinance # shall here-to-fore be known as the "Underground Fuels Storage Ordinance".

Section 2. Purpose

It is the sole purpose of this ordinance to protect the public health and safety of persons and property in Briley Township and to prevent environmental degradation as the result of improper or ineffective storage of fuels underground.

Section 3. Definitions

(a) "Facility" means the location where any commercial, institutional or governmental entity owns or operates underground storage tanks for the storage, use or sale of fuels where the maximum fuel storage capacity is greater than 500 gallons.

(b) "Fuels" means any combustible liquid having a flash point below 200°F including, but not limited to, gasoline, fuel oil, gasohol, kerosene and diesel fuel.

(c) "High Liquid Level Warning Device" means any installed equipment which is capable of emitting an audible warning signal 30 seconds prior to overfilling of the tank(s) or which shuts down the flow automatically before overfilling occurs

(d) "Board" means the Board of Trustees of Briley Township, Montmorency County, Michigan.

(e) "Underground Storage Tank" means a vessel used for storing fuels where the vessel lies more than 10 percent below the surrounding ground surface and which has a capacity of greater than 500 gallons.

Section 4. Operating Permits for Underground Fuel Storage Facilities

(a) Existing Facilities

All existing facilities which have underground storage capacity exceeding 500 gallons must apply for an operating permit from the Board within six months from the enactment of this ordinance.

(b) New Facilities

All new or proposed facilities must receive an operating permit from the Board prior to use of such facility for the storage of fuel.

(c) Operating Permit Fee

A fee, not to exceed one hundred dollars per year, may be assessed by the township for each operating permit. The fee will be based on the facility's maximum storage capacity at the rate of $.01 per gallon up to a maximum of 10,000 gallons.

(d) Operating Permit Duration

Each operating permit will be issued for a period of two years. A 90 day grace period will follow the expiration of an operating permit to allow for the facility to apply for issuance of a new permit. During the 90 day grace period, the facility must continue to comply with the requirements of the previous permit

(e) Application for an Operating Permit

Application by a facility for an operating permit is to be made to the Board. Information to be supplied with the initial application for an operating permit is outlined in Appendix A of this ordinance.

(f) Operating Permit Revocation

The Board may revoke an operating permit only if provisions of the permit are violated by the facility. The Township must notify the facility in writing of the reasons for the permit revocation. The permit shall become invalid 90 days from the date of notification.

(g) Appeals

All appeals regarding permit approval or revocation shall be heard by an appeals board comprising the Briley Township Supervisor, Briley Township Planning Commission Chairman, and the Briley Township Building inspector. Appeals shall be made in writing to the Briley Township Board. An appeals hearing shall be scheduled and held within 60 days of receipt of an appeal. The Briley Township Supervisor shall act as Chairman of the Appeals Board.

Section 5. Underground Storage Construction and Installation Criteria

(a) Storage Tanks

All new or replacement storage tanks shall be designed, constructed and installed to provide maximum protection against leakage or spillage from the facility due to corrosion, breakage, structural failure, or other means. An acceptable design shall be either fiberglass reinforced plastic, epoxy coated steel with cathodic protection, or an equivalent technology approved by the Township.

(b) Overfill Protection

1 - All new storage tank installations shall be equipped with a high liquid level warning device cable of preventing accidental overfilling.

2 - All existing storage tanks must be equipped with a high liquid level warning device within six months after the effective date of this ordinance.

(c) Fill Pipe Protection

The area surrounding the fill pipe for all underground storage tanks must be protected in a manner which will prevent spillage of any product at the filler connection from reaching the soil or groundwater. This protection must be installed on all tanks within one year after the effective date of this ordinance.

Section 6. Testing

(a) New Tanks

All new tanks must be tested for tightness by the owner before being put into service. New tanks shall be tested with air for 30 minutes at 3 to 5 psi after installing in-ground and being connected to piping.

(b) Used Tanks

Used tanks being placed in service must first be tested by the owner using an approved volumetric test, or equivalent, capable of detecting leaks as small as .05 gallons per hour adjusted for variables.

(c) Piping on New Tanks

All piping before being covered, enclosed or placed in use shall be hydrostatically tested by the owner to 150 percent of the maximum anticipated pressure of the system.

(d) Existing Tanks

All tanks which do not meet the construction standards of this ordinance (Section 5) shall be renovated to meet the standards or replaced within 15 years of the effective date of this ordinance. Those existing tanks not in compliance with the construction standards shall be tested for product tightness using a method that nullifies variables and has technology equivalent to or more accurate than the Kent-Moore Tank Tightness Test using the following testing schedule:

Scheduling of Tank Testing

(Age of Tank in Years When Ordinance Takes Effect)

	(1 - 4)	(5 - 9)	(10-14)	(15 or greater)
1983			X	X
1984		X		
1985	X			X
1986			X	
1987		X		X
1988			X	
1989	X			X
1990		X	X	
1991				X
1992			X	
1993	X	X		X
1994			X	
1995				X
1996	X	X	X	

(e) Tanks Suspected of Leaking

The Board has the authority to require testing of tanks suspected of leaking. Testing procedures shall be in accordance with Section 6(b).

Section 7. Inventory Monitoring and Reporting Requirements

(a) Inventory Control

Accurate daily inventory records shall be maintained and reconciled on all underground fuel storage tanks requiring an operation permit. At facilities with multiple tank systems, each system is required to be monitored. Inventory shall be based on actual daily measurement and recording of tank product and shall be reconciled against daily use or sales and product delivery quantities. The inventory shall include a daily computation of gain or loss. Inventory records shall be retained for a period of three years and shall be available to the Board upon request.

(b) Reporting

The operator named on the operating permit shall be responsible for notifying the Board within 12 hours of any abnormal gain or loss not explainable by normal variation due to temperature, spills or other causes. The operator, if not the owner of the facility, must also notify the facility owner to correct any problems. Problem investigation and resolution procedures are included on each operating permit and must be initiated within 12 hours of problem recognition. Those procedures are as follows:

1. The inventory records shall be checked for error.
2. If no error is apparent, an independent calculation of apparent loss shall be made by a qualified person starting from a point in time where the records indicate a no loss condition.
3. If step 2 confirms an apparent loss, the readily accessible physical facilities on the premises shall be carefully inspected for evidence of leakage.
4. If step 3 does not disclose a leak, the dispensing mechanism used with the particular product involved with the apparent loss shall be checked for calibration.
5. If step 4 does not explain the loss, and if the piping system can be tested without the need for excavation, the piping system between the storage tank and dispenser(s) shall be tested. If it is necessary to excavate to perform a piping test, such a test shall be conducted after a storage tank test has been performed in accordance with 6.
6. If step 5 does not disclose a leak, the storage tank(s) may be tested first using a hydrostatic test.
7. If step 5 or 6 do not disclose the source of the problem, the storage tank(s) shall be tested for tightness in accordance with Section 6(b).

8. If step 1 through 7 do not confirm the apparent loss, the daily inventory records shall be reviewed for independent verification by a qualified person. Additional surveillance of the facility should be engaged to ensure against unauthorized removal of product.
9. If any of the above tests or investigations indicate the source of the loss, the owner shall take immediate action to correct the system failure.
10. If, after 7 days the loss continues to be documented and no cause/effect relationship is established, the tank system shall be removed.

Section 8. Abandonment

Underground storage tanks taken out of service, for whatever reason, shall be safeguarded or disposed of by any of the 3 following means.

(a) Temporarily out-of-service

Thanks shall be deemed temporarily out-of-service only when it is planned that they will be returned to active service at the location within 90 days. After 90 Days the tanks will automatically be classified as indefinitely out-of-service. To render tanks temporarily out-of-service the following successive steps shall be taken.

1. The State Fire Marshal and the Township must be notified and a record of the actions taken maintained.
2. All tanks must be filled with liquids but these liquids may not be used during this period.
3. Cap or plug the fill line, gauge opening, and pump riser using appropriate sealing compound on fittings. Fill lines and gauge openings equipped with locking devices qualify for securing those openings.
4. Maintain vent lines as required for tanks in use.
5, Inspect tanks monthly for proper maintenance.
6. Prior to being reactivated for service, proper notification must be given to the State Fire Marshal and the Township.

(b) Indefinitely Out-of-Service

Tanks shall be deemed indefinitely out-of-service only when it is planned that they will be returned to active service at the location within 12 months. To render tanks indefinitely out-of-service the following successive steps shall be taken:

1. The State Fire Marshal and the Township must be notified and a record of the actions taken maintained.
2. All fuels shall be removed.
3. The above tanks shall be filled with water and topped with a non-freezing liquid, with allowance for expansion. Piping, fittings, and buried pumps shall be protected with a non-freezing liquid.
4. Cap all lines except vent lines.
5. Prior to being reactivated, the State Fire Marshal and the Township shall be notified and the system (tank and piping) shall be tested for tightness in accordance with Section 5 (b).

(c) Abandoned

Tanks shall be deemed abandoned when they have become defective and are no longer suitable for liquid storage; are out of use for more than one year; or are no longer of incidental use to the type of occupancy on the property. The following successive steps shall be taken for abandoned tanks within 90 days:

1. The Township and State Fire Marshal shall be notified.
2. All liquids shall be removed.
3. Tanks shall be removed from the ground and the excavation backfilled to grade level.
4. Upon removal, the tanks may be gas freed on the premises if conditions safely permit or transported to an area not accessible to the public and gas freed at that location.
5. When practical difficulty, such as structures above or near the tank, or hardship precludes removal of the tanks, the tanks shall be safeguarded in a manner approved by the State Fire Marshal.

Section 9. Enforcement

The provisions of this ordinance shall be enforced by the Board or their legally appointed representatives.

Section 10. Penalties

Any person or other entity violating this ordinance may have their operating permit revoked for a period of not less than 30 days, or be imprisoned in the county jail for not more than 90 days or assessed a fine of not more the $500.00 or any combination of the above. Each day of operating a facility without a valid permit shall be construed as a separate violation.

Section 11. Severability

Each provision of this ordinance shall be construed as separate, to the end that if any part shall be found invalid for any reason, the remainder shall continue in full force and effect.

Section 12. Effective Date

This ordinance shall take effect on the 31st day after publication as required by law.

APPLICATION FOR A PERMIT TO OPERATE AN UNDERGROUND FUEL STORAGE SYSTEM IN BRILEY TOWNSHIP PURSUANT TO THE BRILEY TOWNSHIP UNDERGROUND FUELS STORAGE ORDINANCE

Facility Owner:

Address: Street

City Zip

Phone

Designated Facility Operator (if different from facility owner)

Name:

Address: Street

City Zip

Phone

Name of Facility:

Location of Facility:

The attached information sheets should be completed for each underground storage tank. Systems consisting of two or more tanks that are connected for expanded storage capacity should be counted as one system and should be described on the same information sheet.

UNDERGROUND STORAGE TANK INFORMATION SHEET

Storage System Location:

Provide a sketch of system location in relation to surface structures

Describe the Location: ____

____

____

____

Describe system construction (i.e. bare steel tank, fiberglass tank, cathodic protection, etc.):

____

____

Tank size(s) (Maximum capacity): gallons

Year of Installation:

List a history of any repairs or documented problems: ____

____

____

____

Is this system presently being used? Yes/No

If yes, please describe: ____

____

____

Does this system have a method of preventing spills at the filler pipe from entering the ground? Yes/No

If yes, please describe: ____

____

____

Does this system have an effective overfill protection mechanism? Yes/No

If yes, please describe: ____

____

____

Please describe the inventory monitoring method used on this system: ______

____

____

Please list any other regular monitoring or maintenance work and intervals of such activities:

____

____

____

SAMPLE DAILY GASOLINE INVENTORY RECORD

At least weekly, review the past week's daily inventory records

Product	Opening Physical Inventory	Previous Days Closing Physical Inventory	-	Sales	+	Receipts	=	Inventory Balance	Closing Physical Inventory	Over (Short)
TOTAL										

* *

CLOSING INVENTORY STICK READINGS F

Tank	Feet/Inches	Product	Gallons
1	/		
2	/		
3	/		
4	/		
5	/		
6	/		
7	/		
8	/		

Operator ______________________

Date ______________________

Forward closing physical inventory F to opening physical inventory B on next day's record.

MANAGEMENT CONSIDERATION: Indiscriminate disposal of small quantities of hazardous or harmful wastes from households and small businesses (NOT including used motor oil)

Problem Description: Areas with unprotected potable aquifers, such as Briley Township are extremely vulnerable to any wastes which are deposited on the ground or enter the soil/water subsurface system. Recently there has become a growing concern over the many hazardous products which are regularly used by households and small businesses and which end up as wastes which are either dumped on the ground, put into the wastewater disposal system or hauled away to the landfill or dump. The number of consumer products that are occasionally or regularly used by the homeowner and that contain chemicals which are known to be carcinogens or human toxins is enormous. Table 2 is a partial listing of household products and their contents that are of concern.

The products that are of greatest concern are those that contain high percentages of organic solvents and that are used in relatively large quantities. These include: petroleum fuels, paint thinners, degreasing agents, automotive fluids and pesticides. Although the use of these products does not always require that wastes are produced, this is often the case. As an example of how the indiscriminate disposal of these wastes can contaminate drinking water consider the following illustration. In Atlanta the depth to groundwater averages 10-15 feet and most wells are in the range of 25-35 feet. The disposal of one gallon of pure solvent could, if evenly dispersed, contaminate the upper 10 feet of the aquifer over an area of one acre; enough to show up in 2-4 wells as 1 part per million of the solvent. (See Figure 6).

The fate of organic solvents once they are in the soil or reach the groundwater is quite variable. Some compounds will volitalize at the surface considerably reducing their threat to groundwater. Some are more readily degraded in the soil by bacteria and other organisms, some may adhere to soil particles and be temporarily or permanently bound up, while other like benzene, toluene and xylene are soluble in water and may readily enter the groundwater. Not withstanding the variability of how a waste gets into the ground or what happens to it after the disposal, the potential for serious contamination is real.

There are three important factors influencing the improper disposal of household products. First, a vast majority of people are unaware of the

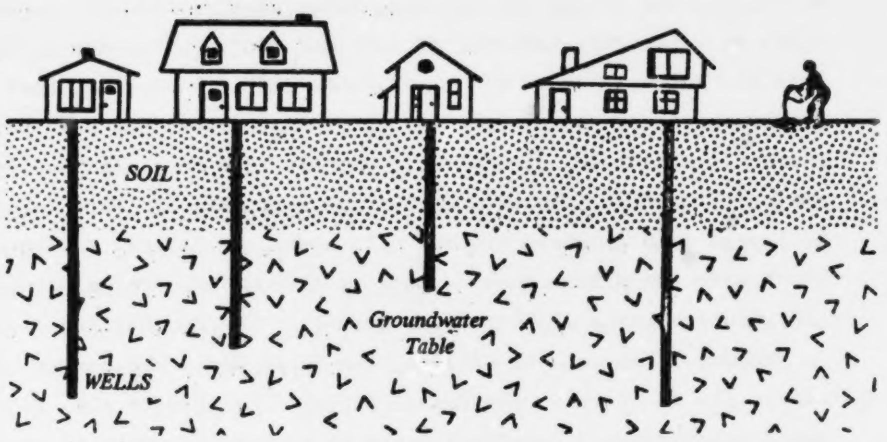
TABLE 3

COMMON HOUSEHOLD PRODUCTS AND THEIR TYPICAL INGREDIENTS*

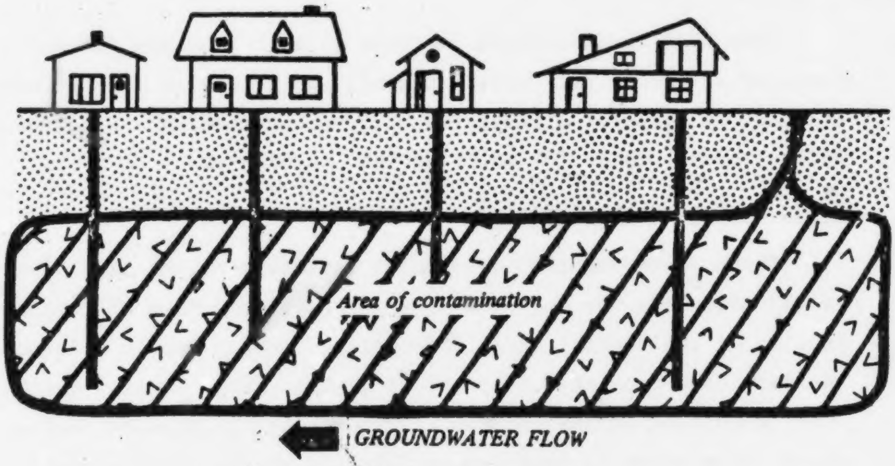
PRODUCTS	TYPICAL INGREDIENTS
Organic Solvent Cesspool Cleaners and Drain Aids	1,1,1 Trichloroethane Methylene chloride Ortho dichlorobenzene Para dichlorobenzene
Paint and Varnish Removers	Methylene chloride Benzene Toluene Acetone Methanol
Household Cleaners, Disinfectants and Oven Cleaners	Methylene chloride Petroleum distillates O-phenylphenol
Laundry Degreasers	Perchloroethylene
Paint Thinners and Solvents	Toluene Acetone Trichloroethylene Methylene chloride Methyl ethyl ketone Butyl acetate 1,1,1 trichloroethane Xylene Dichloroethane
Engine and Metal Degreasers	Petroleum distillates Perchloroethylene Toluene Methylene chloride
Toilet Bowl Deodorizers	Paradichlorobenzene
Gasoline, Kerosene, and Fuel Oil	Benzene Toluene Xylene Ethyl benzene N-Propyl benzene Trimethyl benzene
Anti-freeze	Ethylene glycol
Pesticides	(Numerous)

* Ingredients listed are not common to all products within each category.

FIGURE 6 : POTENTIAL IMPACT OF "BACKYARD" DUMPING OF SMALL QUANTITIES OF HAZARDOUS WASTE


SOIL
Groundwater Table
WELLS

a. Dumping of 1 gallon of waste X.


Area of contamination
GROUNDWATER FLOW

b. Contamination of up to 1 million gallons of groundwater with 1 part per million of waste X.

potential for creating problems through the disposal of products that they use. Safe drinking water is a part of life that is taken for granted and other than the effort to turn on the tap, little is thought of how our other activities may affect our drinking water supply. Second, because of incomplete or misleading labeling of consumer products, consumers are unaware of both the harmful nature of the contents and of proper disposal methods. Very few products give complete listings of ingredients and even fewer provide appropriate disposal directions. Finally, the real alternatives for disposing of harmful household wastes are extremely limited. Most chemicals, if poured into a septic system, will either be harmful to the organisms which make the system work or will go through the system untouched and enter the ground via the drainfield or drywell. The landfilling of harmful liquids is prohibited by Act 641 of 1978, the Solid Waste Management Act (R 299.4315 (8)). Act 64 of 1979, the Hazardous Waste Management Act, does not require small quantities of hazardous waste to be managed under the provisions of the Act, but it does require that all hazardous waste be disposed of at facilities licensed under Acts 64, 641, 245 or 348. The result is a dilemma which does not provide for an easy, yet legal, method of disposal for small quantities in Briley Township.

Some homeowners utilize leftover liquids that are flammable to start fires or soak logs in. Others normally allow wastes such as used paint thinners to evaporate. Both evaporation and burning are disposal techniques which prevent waste from entering the groundwater.

Existing Management Efforts:

There is no existing management structure at the local level which directly addresses the problem. The sanitary code does address the general problem of residential waste disposal and public health nuisances. The sanitary code regulates disposal of garbage (food wastes) and rubbish. Rubbish is defined in the code as "All nonputrescible solid wastes, excluding ashes, consisting of both combustible and noncombustible wastes such as paper, ... or litter of any kind that will be a detriment to the public health and safety." This can be interpreted to include hazardous materials such as solvents, thinners, etc. The code allows disposal of garbage and rubbish on private property as long as a health problem or nuisance is not created. The sanitary code also contains provisions for investigation, and removal or abatement of public health nuisances. A nuisance is defined as "Any unlawful act or omission to perform a duty, which act or omission either annoys, injures, or endangers the comfort, repose, health or safety of others to the extent as to affect the public in general." The code enables the health officer to order private property owners or occupants to remove or abate any "nuisance, source of filth, or cause of sickness which creates a health hazard and affects the public health ...".

The health department, thus, can be called upon to react to problems which may result in a public health nuisance or hazard. Currently, there is no active program of the health department to address the small quantity issue.

Regulations concerning disposal of hazardous or liquid wastes are principally Act 641 of 1978, the Solid Waste Management Act; Act 64 of 1979, the Hazardous Waste Management Act; and, Act 245 of 1929, the Water Resources Commission Act. Under the approved rules for Act 641, the Montmorency-Oscoda County Landfill will be a Type II Sanitary Landfill which does not allow for disposal of liquid or hazardous wastes. It is reasonable to assume, however, that small quantities of liquid or hazardous wastes are currently being disposed of at the landfill. Because this is not an environmentally sound disposal mechanism and because it is not allowed under the rules, it cannot be recommended that this activity be continued. Act 64, as stated before, does not require small quantities of hazardous wastes to be managed but it does require all hazardous wastes to be disposed of at proper disposal sites. Again, there are no licensed facilities in Montmorency County which can meet the disposal site requirements of Act 64. Finally, Act 245 prohibits the disposal of any wastes which may cause harm to waters of the state.

The Department of Natural Resources, under Act 245, controls groundwater discharges by a permit process similar to the NPDES permit system for surfact water discharges. Although this Act does not provide a preventative program for small quantity disposal, it does provide authority to mitigate problems once they have arisen.

The labeling of hazardous or toxic consumer products is controlled by Act 181 of 1965, the Hazardous Substances Act, for intrastate commerce. For interstate commerce, labeling requirements are under the jurisdiction of the U.S. Consumer Product Safety Commission. At this time there are no labeling requirements at the State or Federal level for proper disposal of leftover or unusable hazardous or toxic products.

Management Alternatives:

The effective management of small quantities of hazardous wastes must include three components; education, alternative disposal techniques, and improved product labeling. Each of these components are interrelated with the others. The following are recommendations to deal with each component separately. However, all three must be implemented as a package in order to promote effective management.

Education: An education program to inform the public about the concern over disposal of small quantities of potentially harmful wastes can take many forms. The news media may participate by printing articles on the matter to reach the broader public. The health department may make literature, in the form of small information pamphlets, available for distribution at their offices. The Township may also want to participate in such a program. Basic information should include a listing of common products which are of concern, their chemical contents, how groundwater can be affected and alternative means of disposal.

Alternative Disposal Methods: Without a proper alternative to indiscriminate dumping, the small quantity issue cannot begin to be solved. Three separate approaches have been developed in the course of this study. At this time it is not apparent which one is most feasible from an implementation standpoint by the Township.

Alternative I

Alternative I requires the Township (or County) to establish a collection site to receive small quantities of harmful wastes. Wastes would be segregated into compatible categories and stored in drums or other product tight containers in a protected area. Wastes would be accepted only when supervisory personnel are present. When a large enough volume of wastes has been collected, a licensed waste hauler would be contracted to transport the wastes to a licensed disposal facility. In conjunction with the establishment of a collection site, a Township ordinance would be adopted prohibiting the dumping of hazardous wastes, and requiring that they be disposed of at the collection site. Depending on the quantities of wastes collected, this alternative would require the Township to be classified as a hazardous waste 'generator' and would require the manifesting of the collected wastes. It is estimated that the cost per gallon for collection and disposal using this method would be between $2.00 and $3.50. The requirement that wastes be analyzed for chemical makeup before being disposed of accounts for 30-50% of this cost. It would seem unlikely that residents would be willing to pay this much for disposal.

Alternative II

Alternative II is similar to Alternative I in that a collection site is established and an ordinance is passed prohibiting indiscriminate dumping of wastes. This alternative proposes using an evaporation disposal technique at the collection site. An evaporation bed, constructed out of concrete, filled with sand would be used to slowly allow the evaporation of volatile liquid wastes at the rate of 2-5 gallons/day during the warm weather months. The bed would require a buffer zone to reduce the potential fire hazard and might be located at the county landfill, road commission or future wastewater treatment site. Discussions with the Department of Natural Resources indicate that a facility of this type would require a permit under Act 348 of 1965, the Air Pollution Act, and perhaps require licensing as a hazardous waste disposal facility under Act 64. Costs for the operation of such a collection/disposal system range from $ .25 to $.50 per gallon of waste. These costs would increase significantly if the facility were licensed under Act 64. Initial response from the Township regarding this alternative is that the legal and licensing requirements may be too much for them to handle.

Alternative III

Alternative III is aimed at improving household disposal techniques. Guidelines would be developed describing how homeowners can safely and effectively dispose of their own small quantities of liquid wastes through evaporation and incineration. At the core of this approach is a comprehensive education program to inform residents of proper disposal methods. Many people already allow unusable liquid wastes to evaporate or use flammable wastes for starting fires or augmenting their home heating system. This approach is not as desirable as Alternatives I or II because of the increased potential for carelessness resulting in fires and disposal is not as complete. The question of the liability undertaken by the Township in making recommendations of this type has yet to be resolved.

Consumer Product Labeling:

Consumer products which contain chemicals which may be hazardous to the consumer through the products' use, are required by the Federal Consumer Products Safety Act and the Michigan Hazardous Substances Act to have labeling which states the chemical constituents of the product and appropriate safety cautions. These acts do not, however, require labeling to address the disposal of unused portions of the product. These acts and the rules under which they are implemented must be amended to require labeling warnings regarding improper disposal. Because the state law basically follows the Federal law, and because the Federal law has jurisdiction over interstate commerce, the Federal law must be changed first. This process requires the petitioning of the U.S. Consumer Products Safety Commission with a request for the Commission to review their labeling requirements. At the local level, a visible notice may be placed in retail stores where identified problem products are sold that informs consumers of the proper disposal methods. Again, this would require the development of appropriate disposal mechanisms.

SECTION 6: EDUCATION PROGRAM

An integral part of the success of any resource management program is the understanding of the problem by the people who will be affected by such a program. In the case of groundwater management and protection, the need for education and sharing of knowledge and concerns is even greater than for most resource problems. A number of important educational concepts must be considered in attempting to implement a groundwater protection and management program. One, the general public should be provided with information which will increase their understanding of the importance of groundwater protection, the ways in which individuals can help protect groundwater, and the necessity of local management programs. Two, target groups that will be most directly affected by local ordinances or programs must be provided with background information describing the problem and the intent and importance of implementing local controls. And finally, those local officials or individuals who will be responsible for initiating or implementing a management program must be provided with information and training which will result in a concrete understanding of the issue and, its complex nature, and the intent of such a program.

Implementation of an education program requires that some type of local group or committee be given the responsibility for such efforts. The Township may wish to continue the local advisory committee they appointed for this groundwater study for the purpose of coordinating education and information efforts. Assistance for carrying out an education program should be available from a number of outside sources including the Michigan Department of Natural Resources, the State and local health departments, the Northeast Michigan Council of Governments, and the Cooperative Extension Service. The following recommendations are for specific tasks that should be included in an education program:

1) The local media should be used to provide basic information to Township residents on the existing groundwater problem in Atlanta and the need for better protection of the community's drinking water supply. The vulnerability of groundwater in the area to contamination and the relationship between local activities and potential problems should be stressed in attempting to raise the public's understanding of the problem. Because

the problems in Briley Township are not unique, media sources such as radio and television might be interested in providing indepth coverage of the subject. Included in this type of general media coverage should be recommendations for homeowner disposal of potentially contaminating materials.

2) Prior to enacting the petroleum fuel storage ordinance, all those facilities which will be directly regulated should be brought together at a training seminar. The training seminar would explain the intent of the ordinance, enforcement and compliance procedures, and a review of the technical requirements of the ordinance. Assistance should be requested from the DNR and the State Fire Marshal.

3) Information on groundwater protection should be included in public school curriculums. Junior or senior high school science classes should provide students in the community with an understanding of the importance of protecting local groundwater supplies from common activities which might lead to a contamination problem.

4) The person or persons designated by the Township to enforce the petroleum fuel storage ordinance should receive training in storage technology, monitoring procedures and groundwater protection mechanisms. Training classes, materials or seminars may be available through the Fire Marshal Division of the Michigan State Police, the Michigan Department of Natural Resources or the American Petroleum Institute.

SECTION 7: RECOMMENDED MANAGEMENT STRATEGY

Groundwater management or protection, if it is to be effective, must be comprehensive both in approach and implementation. Section 5 has presented a detailed analysis of issues that affect groundwater quality in Briley Township and management alternatives which can be used as preventative measures. The development of management alternatives, although not easy in itself, is much less complex than the actual initiation and implementation of such alternatives. This problem is aggravated by numerous factors including, public opinion, protection of local business interests, costs of implementation, enforcement of compliance, jurisdiction of authority, and risk assessment. Any decisions by Briley Township to implement protection or management strategies will involve addressing one or more of these factors. Consequently, the procedure used for making recommendations must also take into account these issues and conflicts which affect the feasibility of implementation of each alternative. The restrictive impact of these same factors on implementation can only be avoided by a strong commitment on the part of the Township to achieve a desired level of protection.

Because of the complex influence of numerous factors on the implementation of management alternatives, a single recommended strategy is not believed appropriate. A more reasonable approach is one which is more of a prioritized shopping list of management recommendations. This approach allows the Township to utilize limited resources in an efficient way and allows for dealing with specific management issues one at a time rather than attempting to approve a considerably more costly and complex comprehensive package of alternatives which may result in total lack of support. Based on an analysis of the Township's physical and financial resources, its commitment toward protection and the true management needs of the community, a prioritized list of management alternatives was developed. (See Table 3).

Obviously, not all groundwater contamination problems can be prevented. It is important, however, that the Township be as cognizant as possible with regards to the types of activities which may be threatening to groundwater quality. The Township Zoning Ordinance provides the best tool for recognizing the potential of larger developments in the Township for creating problems or being affected by past incidents. The Health Department deals

TABLE 3: PRIORITY OF MANAGEMENT SYSTEM COMPONENTS

PRIORITY	MANAGEMENT RECOMMENDATION	RELATIVE MANAGEMENT PRIORITY	RELATIVE IMPLEMENTATION DIFFICULTY
1	Enactment of township petroleum fuel storage ordinance (page 41)	High	High
2	Pursue wastewater treatment and collection for Atlanta (page 27)	High	Very High
3	Develop and carry out a groundwater protection education program (page 61)	High	Medium
4	Enactment of township hazardous waste disposal ordinance (page 58)	Medium High	High
5	Develop township collection center for small quantities of hazardous waste (page 58)	Medium	Very High
6	Amend zoning ordinance site plan review requirements (page 19)	Medium	Medium
7	Amend sanitary code requirements for depth to groundwater and excessive percolation (page 27)	Medium	Medium High
8	Request DNR to survey discharge practices at the Atlanta laundromat (page 31)	Low	Medium Low
9	Require proof of discharge permit prior to zoning approval - amend zoning ordinance (page 31)	Low	Medium
10	Request septage disposal information from Health Department (page 28)	Low	Low
11	Red flag development proposals near township dump for hydrogeological study (page 25)	Low	Medium
12	Install monitoring wells downgradient of township dump (page 25)	Low	High
13	Establish local oil recycling program (page 22)	Low	Medium

with groundwater issues on a day to day basis and can provide valuable input to the Township on the identification, prevention and understanding of problems. Communications between the Health Department and the Township should be increased to a level where pertinent information is always shared. Beyond the immediate control of local government, are the programs and responsibilities of the Department of Natural Resources who, by far, have the greatest knowledge and information concerning groundwater impacts. As with the Health Department, communication pathways between the Township and the DNR need to be improved. Only a small portion of DNR activities require notification of the Township when these activities take place in the Township. It would be in the best interest of the Township to request from the DNR, regular notification of all activities which have to do with the surface and groundwater quality of Briley Township.

Implementation of the management components listed in Table 3 will have positive impacts on the groundwater quality of the Township, some being more important than others, However, the single most important factor that will affect groundwater quality in the future is the commitment that the Township has with regards to the issue, At the time of this report, there are a great many issues and problems which the Township must deal with, groundwater being only one of them, The limited resources of the Township makes it impossible to accomplish every program and deal with every problem that must be dealt with in a complete and successful manner. It is a realization of this project that groundwater protection is but one of those problems that the Township faces.

In the end, it is the Township which must decide where its efforts are most needed and will be most successful. Hopefully, this project has provided the necessary background information and guidance to place groundwater protection high on the Township's list of priorities.

APPENDIX A

WORKING PAPERS AND DRAFT ORDINANCE ON SMALL QUANTITIES OF HAZARDOUS WASTE

THOUGHTS ON COLLECTION AND STORAGE AND DISPOSAL OF RESIDENTIAL AND COMMERCIAL HAZARDOUS WASTES

The purpose of this management mechanism is to provide a safe and easy way to collect, store and dispose of residential and commercial wastes which are not suitable to be landfilled. The following types of wastes are to be included:

Gasoline
Kerosene
Fuel Oil
Oils
Thinners
Solvents
Other petroleum distillate products
Pesticides
Herbicides
Insecticides
Other flammable or hazardous wastes

The concept is to develop management mechanisms which will discourage the potential dumping of harmful wastes on the ground which could lead to groundwater contamination. The strategy must include:

1. An ordinance prohibiting dumping and providing disposal guidelines.
2. The development of a holding/disposal system for certain wastes which can be operated by the township or county.
3. The development of safe disposal means using evaporation.
4. An analysis of the costs involved and who should pay.
5. An analysis of liabilities which might occur to the township or county.
6. An estimation of the quantities which might be involved.

An example system might look like the following.

Motor oil recycling: One gasoline service station which currently stores used motor oil would provide the service of taking oil from residents and county or local garages who change their own oil. Current market prices are in the $ .10 - $ .20 per gallon range. The volume of oil for just Briley Township that could be recycled would be somewhere between 200 - 500 gallons per year. Many people reuse their motor oil or burn it in their heaters which will keep the volume down.

Local Ordinance: A general law ordinance would be developed which prohibits the dumping of all harmful wastes anywhere in the Township. A specific list of general products and inclusion of all chemicals contained in Michigan Critical Materials Register. Perhaps, a home evaporation method for harmful, but volatile liquid wastes in small quantities could be included.

Storage and Disposal Mechanism: At some appropriate township or county maintained location, such as the landfill or the road commission, a facility for collecting, storing, and disposing of those products or wastes which are not supposed to be dumped elsewhere. Collection may entail having someone available during regular hours who can take wastes which are brought there and deposit them in a holding area. Storage may be in 55 gallon drums or in larger above ground tanks like those used for residential fuel oil storage. Compatibility of compounds is a prerequisite for storage. Disposal may be by burning, incineration, evaporation or by having them hauled away by a liscensed liquid waste hauler. Many details must still be resolved in order for such a mechanism to become a realistic alternative. This facility should be able to handle up to 500 gallons per year of wastes.

Collection of Wastes: It would be possible to have solid waste haulers or transfer station operators provide small storage "cans" either on the truck or at the station to pick-up liquid wastes. Compacting trucks certainly do not want flammable liquids or oils to be contained in regular trash pickup because they may cause a fire hazard in the truck. For the most part, it would be up to the individual resident or commercial establishment to transport their wastes to the central collection site.

CONCEPTS FOR THE COLLECTION, STORAGE AND DISPOSAL OF "SMALL QUANTITY" RESIDENTIAL AND COMMERCIAL HAZARDOUS WASTES IN BRILEY TOWNSHIP

The purpose of this management mechanism is to provide a safe and easy way to collect, store and dispose of residential and commercial wastes which are not suitable to be landfilled. The following 'general' types of wastes are to be included:

Gasoline
Kerosene
Fuel Oil
Thinners
Solvents
Other Petroleum Distillates
Pesticides
Herbicides
Insecticides
Other Flammable or Hazardous Wastes

The overall concept is to develop management mechanisms which will discourage the potential 'backyard' dumping of harmful wastes on the ground which could lead to groundwater contamination. The strategy must include:

1. An ordinance prohibiting dumping and providing disposal guidelines.
2. The development of a holding/disposal system for certain wastes which can be operated by the township or county.
3. The development of safe disposal means using evaporation.
4. An analysis of the costs involved and who should pay.
5. An analysis of liabilities which might occur to the township or county.
6. An estimation of the quantities which might be involved.

The Briley Township System might include the following:

Local Ordinance: A general law ordinance will be adopted which prohibits the dumping of all harmful wastes anywhere in the township (a rough draft is enclosed)

Motor Oil Recycling: A used motor oil recycling network will be established to utilize this valuable portion of the waste stream. This will be run through commercial or municipal garages.

Collection, Storage and Disposal: At some appropriate township or county maintained location, such as the sanitary landfill or the road commission, a facility for collecting, storing and disposing of those products or wastes which should be disposed of in a manner which will not cause environmental problems. Storage at the site may utilize 55 gallon drums, or larger above ground tanks, in a properly maintained containment area. Vessels to be used for any non-compatible wastes must be clearly marked and separated. The advantage to utilizing a local governmental facility for such a site is in having employees available during normal working hours who can supervise the collection of wastes. The ultimate disposal of the collected wastes can take two forms. One, the wastes can be stored until such time as the quantity is sufficient to warrant transportation by way of a licensed liquid industrial waste hauler to a licensed Act 64 disposal facility. Current costs for this service based upon 250 gallons in 55 gallon drums would be:

Analysis	$400
Pick-up	$150-400
Disposal	$50-100
	$600-900

or $2.40-$3.60/gallon

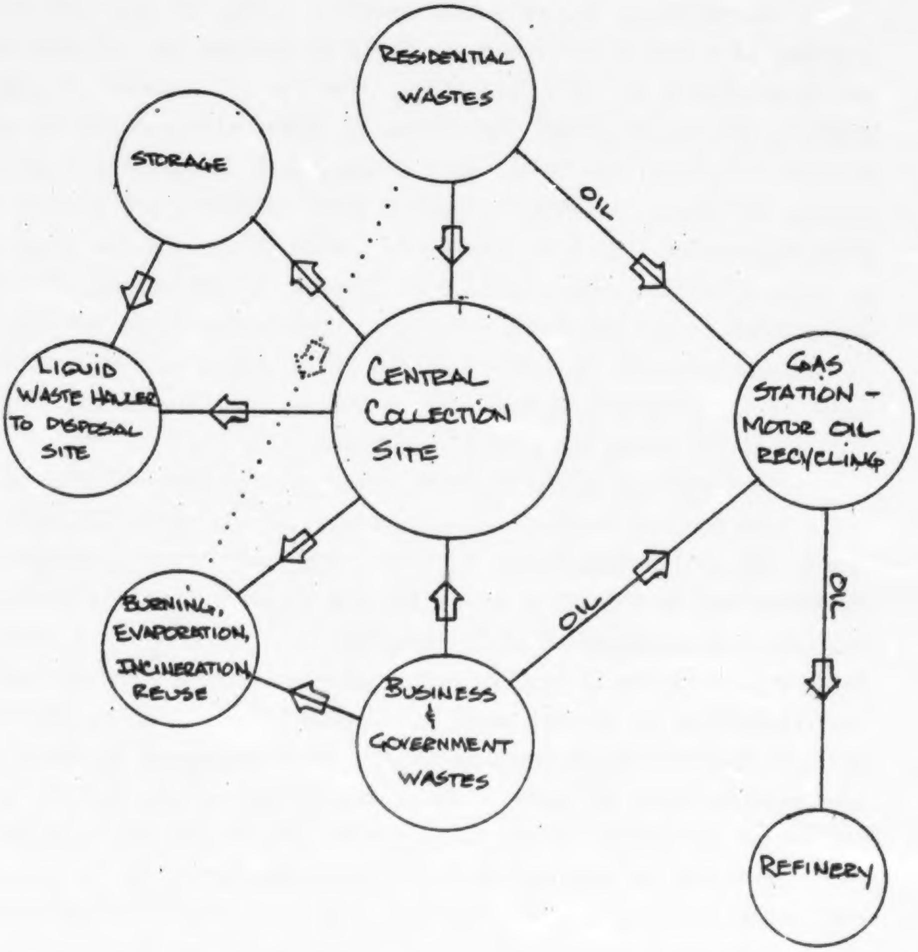
If this approach is to be financially feasible, a user charge of $2.40-3.60/gallon must be charged. Although some commercial establishments may be willing to pay this amount, it is doubtful that any homeowner would be so environmentally conscious and will probably continue to dump in his backyard. If the township should feel that this service is important enough, then monies from the general fund may be used to offset the user charge.

Another possible disposal means for the more volatile wastes is an evaporation system. Techniques such as this have been used successfully by agricultural experimental stations to substantially reduce the quantity of pesticide and herbicide wastes. The basic system for this application might involve a 6' x 6' x 2' deep concrete evaporation bed filled with dark sand. A ventilated cover to prevent precipitation from entering the bed would be necessary, perhaps one which automatically covers the bed when a precipitation event occurs. Evaporation would only take place during the warmer months necessitating winter storage capacity. Liquid volatile wastes would be applied to the bed in a manner which would facilitate effective evaporation while maintaining ambient air quality conditions. This system would require periodical disposal of the sand and other solid wastes.

The costs for operation of such a system per gallon would be negligible in comparison to disposal by currently approved methods. It is estimated that the evaporation technique could handle approximately 500 gallons per year. The initial cost of construction (estimated at $1,000.00) plus the indirect costs of labor, provided by an already existing full-time employee, make this option much more feasible. A user charge for this approach might be closer to $.25-$.75/gallon depending on the generator (residential vs. commercial).

The flow of "small quantity" wastes may be described by the flow chart in Figure 1.

FIGURE 1 - 'SMALL QUANTITIES' WASTE FLOW


RESIDENTIAL WASTES
STORAGE
OIL
LIQUID WASTE HAULER TO DISPOSAL SITE
CENTRAL COLLECTION SITE
GAS STATION - MOTOR OIL RECYCLING
BURNING, EVAPORATION, INCINERATION, REUSE
OIL
OIL
BUSINESS & GOVERNMENT WASTES
REFINERY

POTENTIAL GROUNDWATER CONTAMINATION PROBLEMS ASSOCIATED WITH HOUSEHOLD PRODUCT USE AND DISPOSAL IN ATLANTA, MICHIGAN

The extent of the role that people can play in localized water pollution problems as a result of common household activities has not been long recognized and is certainly not well understood. The use and disposal of numerous consumer products has the potential to pollute our water with a multitude of harmful organic chemicals, in addition to the more conventional inorganic and microbiological components of household wastes. These organic chemicals are present in hundreds of products ranging from oven cleaner to garden sprays and can enter the environment by disposal on the ground surface or through on-site wastewater disposal systems. While there is not extensive scientific proof correlating the use and disposal of consumer products in and around the house with groundwater contamination and human health problems, common sense dictates that caution and good judgment be made a part of using the products described here.

Such caution is particularly important for the situation in Atlanta which has a high concentration of septic systems, highly permeable soils and aquifer types, and a high groundwater table. Historically, septic system failure has been characterized in hydraulic terms; backing up of toilets and sinks, as well as ponding from soil clogging or soil compaction are highly visible forms of failure. Failure of a system to sufficiently remove pollutants from the wastewater is a less recognized or obvious problem. Highly permeable soils can allow rapid movement of contaminants to groundwater and sand and gravel aquifers may transmit these contaminants great distances. Thus, septic systems may fail in terms of how well wastewater is treated before the water is returned to the aquifer.

Analyses of consumer products have revealed a list of organic chemicals that looks like pages from a chemical catalog. Many of these compounds are known to be toxic and include some of the contaminants that have been found in Atlanta well water samples. What follows is a discussion of activities that may cause contamination of groundwater through the use and disposal of these consumer products both outside of the house and into the house on-site system.

Petroleum-based products and other harmful compounds are used around the driveway and garage and in automobile maintenance. For example, cleaners and degreasers are used to clean paved driveways (which may be coated with tar or other sealers) while oil is sometimes used for dust control. Automobile crankcase oil, radiator fluid and flushes, engine degreasers, transmission oil, brake fluid. car waxes, and tar removers are often drained onto the ground. Some of these products are dripped onto the ground from chronic leaks. Each of these substances contains harmful materials and may cause contamination problems when disposed of in this way by simple percolation into the ground. Fuel and oil are also used around the yard in lawnmowers, chainsaws, and garden tillers, and can be spilled on the ground during filling or when repairing the machines.

Another important activity involving lawn and garden care is the application of pesticides and fertilizers and the disposal of the excess directly onto the ground. Many of these chemicals are toxic and may persist without biodegrading. Use of these products may therefore result in contamination of the groundwater.

Other activities using hazardous products are often performed outside. For example, paints, varnishes, lacquers and associated thinners, solvents and strippers are often used outside where excess material and waste are left on the ground. This is easy to do when washing down paint stripper or cleaning paint brushes. Benzene, toluene, and xylene, which are contaminants found in Atlanta well water samples, are also common ingredients in some paint thinners and cleaners. For example, one solvent on the market is 100% xylene. While it may be difficult to conceptually relate the use of such products to groundwater contamination, the link is possible and such activities should be considered potentially dangerous.

Additional potential sources of groundwater contamination around the house are fuel oil and gasoline storage tanks. Problems may arise from leaky tanks and spillage during filling or pumping of the tanks. Much information is available on the proper design, construction, maintenance and safe filling practices of these tanks. Any storage tank (especially underground) must be considered a potential source of groundwater contamination if the tank contains petroleum products or other hazardous materials. Proper procedures for abandoning tanks must be followed so that partially filled tanks are not forgotten and left to corrode and contaminate the groundwater.

Except for on-going problems such as leaky storage tanks or automobile oil leaks, the activities described above occur on an irregular basis and usually involve relatively small volumes of material. But due to the nature of the materials and the porosity of the soils these activities cannot be ruled out as potential contributors to the contamination of Atlanta's groundwater.

Some of the products discussed above and other products that contain hazardous ingredients are used in the house and find their way into the septic system. While the fate of these materials is uncertain, there is likelihood that hazardous substances pass through the septic tank, into the drainfield or dry well, and then percolate through the ground to contaminate the groundwater. These substances can enter the septic system by way of the washing machine, utility tub, toilet, garbage disposal, kitchen sink, automatic dishwasher, bath and shower and bathroom sink.

A U.S. Environmental Protection Agency report lists categories of consumer products used in the household that contain toxic chemicals. These major sources of toxic materials are:

- cleaners
- cosmetics
- deodorizers
- disinfectants
- house and garden pesticides
- preservatives
- medicines
- laundry products
- ointments
- paint and paint products
- photographic products
- polish
- soaps

Products in these categories vary in the amount of toxic chemicals they contain and in the frequency and volume of use and disposal. While it is difficult for consumers to know the amount and type of toxic compounds in some of the products they use, it should be easier to recognize other products, such as pesticides and paint thinners, as being potential groundwater contaminants. Further research will aid in identifying other products that contain toxic compounds and whose use or disposal should be restricted for environmental or health reasons.

One result of using these household products is a complex wastewater that contains very low levels of organic and inorganic compounds. At present, much work remains to be done to identify and measure the concentrations of toxic compounds in household wastewater, to determine the effect of septic tanks and soil absorption systems on these compounds, and to determine the quality of the adjacent groundwater. The ultimate concern is the effect of this household discharge on the environment and human health. The point is that a household with an on-site waste treatment system which discharges the wastewater in the subsurface and into the groundwater may be an important source of pollution and a possible risk to public health. In a community such as Atlanta that has a populated area with on-site disposal systems, ineffective treatment by these systems could result in groundwater contamination or well water contamination.

In summary, while the relationship between the use of many consumer products in and around the house and the problem of groundwater contamination is not well documented, there is a strong possibility that a relationship does exist. This is especially true in the case of Atlanta, where a dense area of on-site systems overlies shallow groundwater and highly permeable soils and aquifer type. Further research will provide information that will be useful in evaluating the significance of using and disposing of many household products that contain toxic compounds. In the meantime, the susceptibility of groundwater to contamination in a place such as Atlanta should be part of the awareness of local residents in their use of products in and around the house. It is hoped that this awareness will result in a common sense approach to the use and disposal of products, such as pesticides and paint thinners, that are known to contain toxic compounds. It is time that people recognize that common household activities may be a cause of groundwater contamination and that alternative methods of product use and disposal or even restrictions on certain products may be necessary. This may include consumer education, or perhaps a hazardous materials collection center. These and other management techniques will be discussed in greater detail in the proposed groundwater management strategy for Briley Township.

BRILEY TOWNSHIP ORDINANCE # _____

AN ORDINANCE TO REGULATE THE USE, STORAGE, AND DISPOSAL OF HAZARDOUS AND TOXIC SUBSTANCES IN BRILEY TOWNSHIP.

It is hereby enacted by the Township Board of Briley Township, Montmorency County, Michigan pursuant to the authority granted by P.A. 246 of 1945, an ordinance as follows:

Section 1. Title

Briley Township Ordinance # _____ shall here to force be known as the "Briley Township Groundwater Protection Ordinance."

Section 2. Purpose

It is the purpose of this ordinance to enhance and preserve the public health, safety and welfare of the persons and property of Briley Township by protecting the groundwater of Briley Township from degradation resulting from the improper use, storage or disposal of hazardous and toxic substances.

Section 3. Definitions

(a) "Act 64" means Act No. 64 of the Public Acts of 1979, as amended, being MCLA 299.401 et seq. and known as the "Hazardous Waste Management Act".

(b) "Act 136" means Act No. 136 of the Public Acts of 1969, as amended, being MCLA 232.271 et seq. and known as the "Liquid Industrial Wastes Act".

(c) "Act 207" means Act No. 207 of the Public Acts of 1941, as amended, being MCLA 29.1 et seq. and known as the "Fire Prevention Act".

(d) "Act 245" means Act No. 245 of the Public Acts of 1929, as amended, being MCLA 323.1 et seq. and known as the "Water Resources Commission Act".

(e) "Act 348" means Act No. 348 of the Public Acts of 1965, as amended, being MCLA 336.11 et seq. and known as the "Air Pollution Act".

(f) "Act 368" means Act No. 368 of the Public Acts of 1978, as amended, being MCLA 333.12703 et seq. and known as the "Public Health Code".

(g) "Act 399" means Act No. 399 of the Public Acts of 1976, as amended, being MCLA 325.1001 et seq. and known as the "Safe Drinking Water Act".

(h) "Act 641" means Act No. 641 of the Public Acts of 1978, as amended, being MCLA 299.401 et seq. and known as the "Solid Waste Management Act".

(i) "Degrade" shall mean for the purposes of this ordinance, to change in quality in a manner which reduces the existing or intended use of groundwater or surface water.

(j) "Discharge" means the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of some product upon or into any land, groundwater or surface water within Briley Township.

(k) "Garage" means any commercially operated structure where repair, construction, modification or washing of motorized vehicles takes place.

(l) "Hazardous Waste" means any waste or substance described in Rule 201 of Act 64.

(m) "Hazardous or Toxic Substance" shall be a term used to generally describe hazardous wastes including but not limited to the following:

gasoline
kerosene
fuel oil
motor oil
diesel fuel
mineral spirits
brake fluid
transmission fluid
anti-freeze
petroleum based degreasers
petroleum based cleansers
radioactive wastes
infectious wastes
strippers
paint
varnish
thinners
solvents
pesticides
insecticides
herbicides
hazardous wastes as defined by Act 64
compounds on the Michigan Critical Materials List

(n) "Petroleum Fuel Storage Tank" shall mean to include all tanks used for the storage of leaded and unleaded gasoline, kerosene, fuel oil and diesel fuel.

Section 4. General Prohibitions

(a) It shall be unlawful for any person to discharge hazardous or toxic substances in Briley Township unless such discharge is specifically allowed and/or permitted under provisions or permits of Act 64, Act 245, Act 348, Act 368 or Act 641, or other Michigan statutes which provide for regulation of discharges of hazardous or toxic substances.

(b) It shall be unlawful for any person to use, store, transport, or discharge hazardous or toxic substances in Briley Township in such a manner as to violate Michigan law regulating such use, storage or transportation or in such a manner as to degrade or seriously threaten to degrade the surface or groundwaters of Briley Township.

(c) It shall be unlawful for any person to use, store, discharge, or transport hazardous or toxic substances in Briley Township within the guidlines of Act 64, Act 245, Act 348, Act 368 or Act 641, without notifying the Township Board of proposed or existing activities requiring regulation under the above mentioned Acts and providing proof of any permits required by the above mentioned Acts for such activities to the Township.

(d) Unlawful discharge shall include, but not be limited to the following:

1. Dumping of hazardous or toxic substances which may generally be described as including, but not limited to gasoline, kerosene, fuel oil, petroleum based solvents and thinners, motor oil, petroleum based degreasing agents, cleaning fluids, paint and varnish removers, pesticides, herbicides and insecticides on private or public property;

2. Leaks from petroleum fuel storage tanks, both above and below ground;

3. Spills during transport or transfer of hazardous wastes including fuel oil and other petroleum fuels;

4. Disposing of hazardous or toxic substances to septic systems, storm sewers, storm drains, or sanitary sewers.

Section 5. Fuel Storage Tanks

(a) Owners of all subsurface fuel storage tanks in excess of 500 gallons capacity in Briley Township shall provide to the Township no later than 120 days from enactment of this ordinance, information regarding the location, size, construction, use and history of such tanks on forms available from the Township. Copies of evidence of date of purchase and installation should be included.

(b) Where information cannot be provided which can reasonably assure the Township Board, or its appointed representative, that a tank is product tight and has no structural faults, the Township may order the tank to be exposed, tested, monitored, made unusable, or removed at the owner's expense.

(c) Owners of all commercial subsurface fuel tanks in excess of 500 gallons capacity, which are considered to be in use, must maintain daily inventory records which are capable of showing the

the existence of fuel losses. Owners must submit quarterly reports to the Township, on standardized forms provided by the Township, certifying by means of their inventory records that no losses had occurred during that quarter. If losses are recorded, the owner must report the incident to the Township within 24 hours and notify other appropriate officials and agencies as provided in Act 207. Tanks which are found to be leaking must be emptied within 24 hours.

(d) All new construction or installation of subsurface fuel storage tanks larger than 500 gallons shall meet the requirements of Act 207 and shall meet the following additional criteria:

1. All tanks must be equipped with overfill protection;
2. All tanks must have a striker plate below the dip stick tube to protect the bottom of the tank;
3. Monitoring holes adjacent to tanks must be installed to provide early warning of any subsurface leaks.

(e) All commercial tanks which are abandoned or temporarily out of use must comply with the provisions in Act 207 for abandonment.

(f) Any tank which is found to be leaking and is greater than five years old must be removed and made unusable by making a sufficient number of holes in the tank.

Section 6. Garages

(a) All new construction of garages must meet requirements of the Michigan Plumbing Code with regard to installation of separators on all drains. Wastes separated from the drain water must be contained in a properly ventilated holding tank of not less than 1,000 gallons in capacity. Wastes collected in the holding tank must be removed only by a licensed liquid waste hauler. Wastes must either be transported to a licensed hazardous waste disposal facility or to a local holding facility if one exists.

(b) All used motor oil must be stored in secure containers and must be removed from the premises only by a licensed liquid waste hauler.

Section 7. On-Site Wastewater Treatment

(a) All new on-lot sewage disposal systems shall meet a minimum site criteria of six feet between natural surface grade and the seasonal high groundwater level or the maintenance of four feet of natural soil between the seasonal high groundwater level and the bottom of the drain tiles in a trench or bed system.

(b) The use or sale of cesspool or septic tank cleaners, de-cloggers, or degreasers of which the active ingredients are organic solvents such as 1,1,1 Trichloroethane, Methylene Chloride, or (O,P) Dichlorobenzene shall be prohibited.

Section 8. Variances

(a) Although the provisions of this ordinance are meant to be followed with strict compliance, there may be certain individual cases where a variance may be given which will still allow for consistent protection of groundwater resources.

(b) All requests for variances must be in writing to the Township Board and must contain all specifications, studies, or evidence showing why such a variance should be granted.

(c) If in the opinion of the Township Board, a requested variance will not jeopardize or degrade the groundwater, then a site specific variance will be granted. The specifics of the variance will be made in writing including any and all conditions of the judgement.

(d) In no case shall the Township Board make judgement in favor of giving a variance which will violate existing state or federal law.

Section 9. Enforcement

The provisions of this ordinance shall be enforced by the Briley Township Board of Trustees or their legally appointed representative.

Section 10. Penalties

Any person or other entity violating this ordinance may be imprisoned in the county jail for not more than 90 days, or assessed a fine of not more than $500.00, or both.

Section 11. Severability

Each provision of this ordinance shall be construed as separate, to the end that if any part of it shall be held invalid for any reason, the remainder shall continue in full force and effect.

Section 12. Effective Date

This ordinance shall take effect on the 31st day after publication as required by law.

APPENDIX B

WORKING PAPER - POTENTIAL GROUNDWATER CONTAMINATION PROBLEMS ASSOCIATED WITH GASOLINE SERVICE STATIONS

POTENTIAL GROUNDWATER CONTAMINATION

PROBLEMS ASSOCIATED WITH

GASOLINE SERVICE STATIONS

In Atlanta there are currently four active and two inactive gasoline service stations. Because of the traffic generated by M-32 and M-33 and the needs of local motorists, there will always be a number of gasoline service stations in Atlanta. As a category, these facilities represent one of the greatest concerns to the protection of groundwater quality. It is highly suspect that at least part of the existing contamination problem in Atlanta is the result of activities or accidents which are associated with the stations in the "downtown" area. Gasoline has over 100 different hydrocarbon components, of which benzene, toluene and xylene are three of the most toxic and prominent. These three organic compounds are also the same contaminants which have been identified in all of the affected wells. The solubility of these compounds in water and their relative abundance in gasoline make them a common indicator of contamination from gasoline.

The following working paper is an attempt to explore in depth the many potential problems that can result from activities at gasoline service stations. This review of "potential" problems should in no way be taken as a given for all gasoline stations, but rather as an illustration of situations which may have occurred in the past or may presently be occurring.

PETROLEUM FUELS AS A CONTAMINANT

For the purposes of this report, gasoline will be the term used to describe the bulk of fuel which is stored and sold at service stations. Some stations also store and sell fuel oil, kerosene, and diesel fuel, which are somewhat different in character from gasoline but are still to be considered as highly potential contaminants.

The production of fuels such as gasoline is just one of the many uses made of crude oil. Crude oil consists of a wide range of compounds categorized as hydrocarbons because they are structured of only hydrogen and carbon atoms. Simple hydrocarbons are generally classified by the number of carbon atoms they contain. Hydrocarbons with between 5 and 12 (C_5-C_{12}) carbons are typically retrieved in the refining process from crude oil for use in the making of gasoline. Because the hydrogen and carbon atoms can be arranged in a multitude of different arrays, as many as 180 different hydrocarbons may be present in the gasoline you put into your tank. Among these 180 are many which have been identified as toxic or carcinogenic. In addition to the multitude of compounds listed above which make up the basis of gasoline, many additives are used to increase the efficiency of the fuel, to prevent damage to engine parts and to accomplish a number of other storage and combustion related requirements. Different refineries blend in different additives so that usually, no two gasolines are exactly alike.

Among the components of gasoline which are considered to be of greatest concern with respect to groundwater contamination are:

Benzene
Ethyl Benzene
N-propylbenzene
Toluene
1,2,4-Trimethylbenzene
1,2,5-Trimethylbenzene
xylene

Benzene, toluene and xylene have all been found in contaminated wells in Atlanta. Benzene is considered the most severe because it is a known carcinogen. Toluene and xylene, although they are not conclusively labeled as cancer causing, are also toxic to humans. Two common additives to gasoline, tetraethyllead for regular gasoline and dichloroethane as a lead scavenger, are also considered to be highly toxic to humans. However, it is doubtful that the occurence of dichloroethane in two contaminated wells is from gasoline. All of the compounds listed above are on the Michigan Critical Materials Register.

GASOLINE STORAGE AND DELIVERY SYSTEMS

According to the Department of Natural Resources, most contamination problems involving gasoline are the result of leaks or spills from gasoline storage tanks. Typically, stations in the Atlanta area have 2-6 tanks with a total storage capacity of 5-15,000 gallons. Because ownership of most stations in Atlanta has changed hands frequently over the years, it is very difficult to determine an accurate history of storage problems at each facility. The age, exact size, and repair history on storage tanks is generally not known by station owners or managers.

Steel storage tanks, which were predominantly used before fiberglass came on the market, are very susceptible to corrosion. A survey by the American Petroleum Institute revealed that 76% of all categorized tank leaks were the result of corrosion. The older the tank and the longer it has been in the ground increase the possibility of corrosion. With groundwater levels in Atlanta as near as 10 feet below the surface, it is suspected that many existing storage tanks may be in or very nearly in saturated soils. Fiberglass tanks are not as susceptible to corrosive forces but are more prone to physical damage caused by "sticking" or poor installation.

Guidelines for storage tank materials, construction and installation are included in the 1973 Michigan Flammable Liquids Regulations. These regulations are part of the Michigan Fire Prevention Code, Public Act 207 of 1941, and are administered by the State Fire Marshall. The main intent of the regulations is to prevent conditions which may be a fire hazard and is not intended to protect the groundwater from contamination. The State Fire Marshall does have the power to require the testing of storage tanks for leaks if there is reason to believe one exists and is resulting in a fire hazard. Testing of tanks is an expensive and sometimes inconclusive tool for identifying problems. If accurate records showing gasoline pumped in and pumped out of a tank are kept by oil companies or station owners, losses may be detected without the necessity of tank integrity testing. However, this type of monitoring is rarely done at the level necessary to detect small losses.

In the past when gas prices were at $.20-$.30 per gallon, it may have been more economical for stations to tolerate a small leak rather than repair or replace the tank. Today's prices have altered this situation somewhat, but small losses are still tolerated from a dollars standpoint.

Aside from contamination or fuel losses resulting from leaking storage facilities, many problems occur during the filling of storage tanks. Carelessness during the filling process can cause tanks to overfill and spill on the ground. Approximately 30% of the problems associated with underground storage of petroleum fuels reported to the Pollution Emergency Alerting System in 1979 were the result of accidental spills of this nature.

Under the Michigan Flammable Liquids Regulations, underground storage tanks that are no longer being used are considered to be abandoned and are classified into three status categories: temporarily-out-of-use; indefinitely-out-of-use and, permanently-out-of-use. Temporarily-out-of-use tanks are those which are expected to be used again within a relatively short period of time and according to the Regulations must be emptied down to the suction line during its non-use period. Indefinitely-out-of-use tanks are those which exist on unoccupied property or which are not expected to be used in the near future. Indefinitely out-of-use storage tanks must be filled with water to expel all flammable liquids. Permanently-out-of-use tanks are those considered to be of no incidental use to the type of occupancy on the property and are usually not expected to be used again. These tanks are truly abandoned and must be removed or filled with sand. Currently, there are at least four abandoned tanks either classified as Indefinitely-out-of-use or Permanently-out-of-use in Atlanta. At this time, it is unknown what the status of these tanks is.

CONTAMINATION POTENTIAL OF AUTO REPAIR PRACTICES

Service stations where auto repair is also part of business can also contribute to groundwater contamination. Chemical products used in the garage are numerous and precautions to prevent their getting into the groundwater are not widespread. These chemicals include but are not limited to: motor oil, unusable gasoline, brake fluids, hydraulic fluids, transmission and differential oils, rustproofing compounds, degreasers, penetrating oils, solvents, paints, thinners, cleansers, antifreeze and fuel oil.

Today motor oil is almost always retained and stored for recycling. In the past, the market for used oil was small and many stations would use open ground as a disposal means. The dumping of oil "behind the station" was alluded to by a number of Atlanta residents during the residential survey as a practice they personally knew of that might cause groundwater contamination.

Working on automobiles or trucks requires the cleaning of parts for reassembly. Some service centers utilize parts washers which recycle solvents through a filtering apparatus. Others use solvents in a suitable container and must dispose of it when it becomes too dirty. Floor drains are an available disposal means which puts the unwanted waste "out of sight." Antifreeze is another waste liquid which might end up in the floor drain as a means of disposal.

The main purpose of floor drains is to remove water from wet cars or dripping snow when cars are brought in for service. Typically, in older stations these floor drains are either hooked into the septic system or have their own drywell. Either way, wastes which should not enter the water table are doing so. Cleaning of garage floors often requires the use of solvents such as fuel oil. Again, the ultimate disposal is the floor drain. Some stations, although none in Atlanta to the best of our knowledge, have installed holding tanks which collect these chemicals. Other petroleum based products also end up on the garage floor and eventually into the floor drain.

The contents of the products which may enter the groundwater through floor drains or "behind the station" dumping read like a critical materials register. Again, many are classified as known or suspected cancer causing chemicals and others are less toxic. The amount of these products which enters the groundwater is totally unknown. Many are quite volatile and may evaporate before being washed down a drain. Many are relatively insoluble in water and, therefore, may not travel very far in the groundwater flow. However, the fact that the practice exists is reason enough for concern.

Outside areas where gasoline filling or auto repair takes place may also contribute to the overall problem. Rain events will wash remnants of what may fall on outside paved areas into the street. Storm sewers on M-32 in downtown Atlanta would receive this runoff and discharge it to the Thunder Bay River below the impoundment. The east end of town is not serviced by storm sewers and runoff enters the ground directly or flows into roadside ditches.

SUMMARY

Activities which are common to most gasoline service stations can and do have a detrimental impact on the groundwater in Atlanta. Any contaminant which enters the ground at a service station can quickly reach the unprotected shallow aquifer which is used by the community as the sole source of drinking water. Specific regulations governing this problem are non-existent. General rules of the Water Resources Commission, Public Act 245 of 1929, make it unlawful to "...discharge into the waters of the state,..any substance which is or may become injurious to domestic, commercial, industrial, agricultural, recreational, or other uses which are being or may be made of such waters." This is a "blanket" type regulation which is used to prevent any unauthorized contamination of surface or groundwaters. The local sanitary code as administered by District Health Department #4 also contains language which makes it unlawful to dispose of wastes which may be or become a nuisance to public health. Without specific regulations, it becomes a guessing game as to whether certain activities are unlawful or if they are hazardous to public health or the environment.

RECOMMENDATIONS

A. Gasoline Storage Tanks:

1. Storage tanks classified as abandoned should be reported to the State Fire Marshall for enforcement of the regulations concerning abandoned tanks contained in the Michigan Flammable Liquids Regulations.

2. Local standards for daily monitoring of inventories for the purpose of detecting leaks should be developed.

3. A survey should be completed regarding the number of tanks, their age, size, location, equipment and any repair records.

4. Any future alterations of existing tanks or installation of new tanks should be reported to the Township.

5. All leaks and spills should be immediately reported to the Pollution Emergency Alerting System and subsequently to the Township.

6. The Township should investigate the possible legal authority they have in requiring testing for tank integrity.

B. Floor Drains and Other:

1. It should be determined where the final discharges of all floor drains in garages are located.

2. Further investigation into the types of products or chemicals being flushed through these systems is needed. This might include sampling by the Michigan Department of Public Health.

3. All "behind the station" dumping should be halted immediately, if any is found to still exist.

4. If it is determined that floor drains are a problem, the Township should institute an ordinance requiring the installation of holding tanks and disposal by means of a licensed industrial waste hauler.

APPENDIX C

PRELIMINARY ANALYSIS OF EXISTING GROUNDWATER MANAGEMENT SYSTEM FOR ATLANTA, MICHIGAN

ANALYSIS OF EXISTING GROUNDWATER MANAGEMENT SYSTEM FOR ATLANTA, MICHIGAN

At present there exists no comprehensive or coordinated system for the protection or management of groundwater in Atlanta. In fact, only recently has there developed an awareness and partial understanding of the many potential sources of groundwater pollution which, as yet, have not been transposed into effective laws, regulations or practices which protect groundwater. As in the case of non-point pollution of surface waters, preventing pollution of groundwater requires addressing each possible pollution source. This involves working with many diverse agencies, organizations, levels of government, and legislative acts, as well as with parties in the private sector and with public education. The following is an assessment of the existing groundwater management system as it presently affects Atlanta. This assessment emphasizes the problem prevention and groundwater protection aspects of the existing management system.

The local level of government that can exert some control over groundwater quality is the Township. It is within the authority of Briley Township to "adopt ordinances regulating the public health, safety and general welfare..." as provided in Public Act 246 of 1945, Township Ordinances. Based on a June 1981 review of the ordinances of Briley Township, it is known that none deals with groundwater protection or management.

In addition, Briley Township exercises its right to establish and maintain zoning districts, allowing it to encourage or regulate "the proper use of land and natural resources" by ordinance as provided in Public Act 184 of 1943, the Township Rural Zoning Act. In part, the purpose of the zoning ordinance is to "promote public health, safety...to limit the improper use of land...to reduce hazards to life and property...to facilitate adequate provision for a system of transportation, sewage disposal, safe and adequate water supply..." and the basis of the ordinance is a plan which conserves "property values and natural resources."

A proposed revision of the zoning ordinance (as of June 1981) allows for the regulation of "areas that have unique land resource problems or need special attention." A discussion of reducing the danger to public health by protecting the quality and quantity of groundwater from conflicting land use activities is found in the proposed Environment and Conservation overlay district. These provisions would not apply to activities affecting groundwater in any other zoning district, however. The existing zoning ordinance, as with the general law township ordinances, contains no specific provisions for the protection of groundwater in Briley Township even though such provisions are alluded to and generally allowed for in the purposes of these ordinances.

Briley Township lies within Health Department District No. 4, whose Board of Health adopted a sanitary code under Public Act 306 of 1927 and which is enforced by a health officer. This sanitary code contains regulations which can control the pollution of groundwater in certain respects. Adherence to the code is dependent on the awareness and the ability of the health officer in enforcing the general and specific regulations of the code, and on the degree to which variances to the code are allowed by the health officer and/or the Board of Appeals. The present code contains provisions regulating sewage disposal, garbage and rubbish, and public health nuisances.

Of these provisions, those regarding sewage disposal are the most specific. A permit is required for the construction of any wastewater disposal facility less than 10,000 gallons/day. These facilities must conform to a series of general and specific requirements pertaining to system design, capacity, construction, soil and drainage conditions, and isolation distances. While these requirements, when followed, can prevent failure of systems, they may not offer protection of groundwater from conventional pollutants or hazardous and toxic consumer products. For example, while the code deems soils with percolation rates above 30 minutes to be unsuitable for on-site wastewater treatment, there are no provisions for limiting development in soils of high porosity and minimal resistance to percolation. Therefore, systems built in the sandy areas of Atlanta may allow septic effluent to percolate rapidly and with little treatment into the shallow aquifer which serves as the sole source of drinking water for the community.

The sanitary code also regulates disposal of garbage (food wastes) and rubbish. Rubbish is defined in the code as "All nonputrescible solid wastes, excluding ashes, consisting of both combustible and noncombustible wastes such as paper,...or litter of any kind that will be a detriment to the public health and safety." This can be interpreted to include hazardous materials such as solvents, thinners, etc. The code allows disposal of garbage and rubbish on private property as long as a health hazard or nuisance is not created.

Finally, the sanitary code contains provisions for investigation, and removal or abatement of public health nuisances. A nuisance is defined as "Any unlawful act or omission to perform a duty, which act or omission either annoys, injures, or endangers the comfort, repose, health or safety of others to the extent as to affect the public in general." The code enables the health officer to order private property owners or occupants to remove or abate any "nuisance, source of filth, or cause of sickness which creates a health hazard and affects the public health...".

As stated above, the local health department issues permits for on-site sewage systems. It also issues permits for private and public water supply wells. The department can inspect and sample private and public wells, review septage disposal sites, make investigations of nuisance complaints, and provide education on such topics as on-site wastewater treatment. The local health department thus has authority, both general and specific, to prevent, detect, and investigate certain aspects of groundwater pollution.

Aside from the local groundwater management activities, there exist on the state and federal levels many activities and responsibilities, some of which are relevant to the situation in Atlanta. Much of this activity is located within the Michigan Department of Natural Resources (DNR). For example, the DNR has funded this present work to develop a protective groundwater management strategy for Briley Township (source of funds is U.S. EPA). This will be part of the state groundwater management strategy. The DNR performs sampling at suspected and known contamination sites, coordinates problem evaluation, and requires hydrogeological investigations to be performed by the party responsible for groundwater contamination. In addition, Pollution Incident Prevention Plans are required for facilities and storage areas handling more than 40,000 gallons of flammable materials. Such a plan was developed for a bulk storage facility in Atlanta north of Haymeadow Creek.

Pollution of groundwater is a violation of state law (Public Act 256 of 1929, Water Resources Commission Act) and the DNR is responsible for enforcing general groundwater quality rules which were filed in August 1980. All usable aquifers of the state are protected for water supply purposes, and discharges into groundwater that are injurious to public health are not allowed. Discharges are regulated by a permit system and by other requirements. This system does not include on-site wastewater treatment systems, which are permitted by the local health department.

The Michigan Department of Public Health (DPH) Water Supply Division registers water well drillers, maintains a file of well logs for public and private water supplies, and ensures proper well abandonment. The DPH Chemicals and Health Center evaluates and refers situations that represent environmental health hazards to the appropriate state agency.

The Michigan Toxic Substance Control Commission concerns itself with, and can investigate problems related to toxic substances. Included is the authority to declare an emergency and regulate the sale, use, and disposal of a substance.

The Fire Marshall Division of the Michigan Department of State Police has the responsibility for enforcing the Michigan Flammable Liquids Regulations and the Michigan Fire Prevention Code (Act 207 of 1941, as amended), which "provide for the prevention of fire and protection of persons and property in the transportation, storage, handling, offering, for sale, sale and use of flammable liquids in the State of Michigan...". This includes regulating the location, setting, design, construction and abandonment of fuel storage tanks and associated fixtures and piping. The regulations also cover private storage of flammables in addition to commercial operations. The regulations require notification of an accidental spillage or leakage of "any considerable amount of a flammable liquid in any incorporated area...". While these regulations offer some protection against groundwater contamination, they were designed to prevent fire hazards, and as such, offer limited protection of the groundwater. For example, a fire marshall can require testing of an underground tank only if there is evidence that a leak has caused a fire hazard. Proposed changes to these regulations are better geared toward identifying and preventing leaks and spills as they relate to groundwater contamination.

Regulation on the state and federal levels has in the past, and can in the future, offer some protection to the groundwater in Atlanta. Existing laws and regulations provide for such protection at least in concept. For example, the Water Resources Commission, through the DNR, has general responsibility to protect the waters of the state. Problem prevention is presently accomplished largely through the use of discharge permits, of which there is none in "downtown" Atlanta. A groundwater protection strategy is being developed to expand the state's ability to prevent problems. The DPH deals with a few aspects of water supply wells. The Toxic Substances Control Commission can regulate the use of certain products that pose a health hazard to humans. The proposed changes to the Michigan Flammable Liquids Regulations may provide needed protection against problems associated with handling and storage of flammable liquids.

The degree to which this regulatory and legislative protection is translated in to actual measures is not clear, and is often impeded by limitations in staff and money. An alternative or complement to state and federal regulation is a system of protection and citizen education based on the local level.

While Briley Township has no zoning or township ordinances that are geared to protecting groundwater, the township has the authority and power to develop and enforce such ordinances. The local sanitary code does allow for some level of protection but does not specifically address the question of groundwater pollution on a level that is consistent with the emerging knowledge and awareness of the problem. However, the general provisions within the code for protecting public health may allow for a greater degree of involvement by the health officer in protecting local groundwater resources.

In summary, a groundwater management "system" in the true sense of the word does not now exist in Briley Township. As assessment of the roles of those agencies and levels of government that can and do affect groundwater quality in Briley Township reveals that while some protection exists, there are sources of pollution that have not been adequately addressed; application and enforcement of laws and regulations that have not been adequately carried out with respect to groundwater contamination; and potential power and authority (especially at the township level) that have not been exercised. Finally, it must be understood that citizen education can play a vital role in protecting groundwater by increasing awareness about those activities that can cause problems. Environmental education can be accomplished most effectively on the local level by the township, by the local health department, or by other local non-governmental organizations.

APPENDIX D

ATLANTA RESIDENTIAL SURVEY - QUESTIONNAIRE & RESULTS

ATLANTA GROUNDWATER CONTAMINATION
RESIDENTIAL SURVEY

INTERVIEWER: ________________________________ DATE: ____________________

TIME: START __________ am/pm FINISH ___________ am/pm

Residence number: ____________________ Location: ____________________

Residence description: ____

How Many Years at Present Address: ____________ Renter/Owner ____________

Age of Home: ____

Number of People in House: ____

Comments: ____

____

WATER SYSTEM

Age of Well: ______________ (Known, Not Known, Guess) If not known, ask if it was installed prior to or after 1967 __________ after/prior

Depth of Well; ______________ (Known, Not Known, Guess)

Any taste or odor problem: __________ When first noticed: ____________

If yes, describe: ____

____

Has water been tested: ____________ If yes, by who __________ When ________

What were the results: ____

Have you been drinking your well water since the health department warning one year ago or have you brought water in? ____________________

Comments: ____

____

WASTEWATER DISPOSAL

What kind of system do you have:

Septic System: __________ (Yes/No) If no, what kind of system do you have?

____

Septic Tank Size: ______ (Gallons)

Drywell or Drainfield (Circle one)

Age of System: ____________________

Last Time Pumped: ____________________ How often is it pumped: __________

Have you ever used a septic system cleaner or degreaser to unclog the drain pipes or to "clean the system out"? ___________ (Yes, No, Maybe)

(If yes, determine if the product used was chemical or bacterial. If possible, find out name of product used and how much was used). ______________

HEATING FUEL

Do you presently heat your house by fuel oil? ____________________(Yes/No)

Have you ever heated by fuel oil? ______________________________(Yes/No)

(If resident has discontinued the use of fuel oil, was the tank emptied and removed?) ____

If yes to either, is tank above ground or below? ____________________

Age of Tank: ___________________ Size of Tank: ____________________

Do you have any reason to believe the tank leaks? ________________ (Yes/No)

Have you ever noticed any spillage? ________________________ (Yes/No)

If yes, please explain: ____

____

____

To your knowledge, have any of your neighbors had any problems with leaking?

___________ (Yes/No)

If yes, please explain: ____

____

CONSUMER PRODUCT USE AND DISPOSAL

Do you ever use paint or varnish removers? ______________________ (Yes/No)

If yes, continue:

Where do you dispose of the wastes? ______________________

How many gallons have you used in the past two years? ______________

Do you ever use laundry degreasers or spot removers such as: Spray & Wash (Textise), Magic Prewash, Shout, etc. ______________________ (Yes/No)

Do you do your laundry at home or at a laundromat? ______________

Do you use solvents or thinners? ______________________ (Yes/No)

How many gallons in past two years? ______________________

Where do you dispose of waste solvents or thinners? ______________

Do you use a toilet bowl deodorizer? ______________________ (Yes/No)

What brand ______________________

Do you ever use pesticides, herbicides, or insecticides? ________ (Yes/No)

Where do you dispose of any wastes from the above ______________

____

Where do you dispose of old or dirty gasoline or kerosene? ______________

____

Do you change your own motor oil? ______________________ (Yes/No)

How many times per year? ______________________

Where do you dispose of waste oil? ______________________

Do you change your own anti-freeze? ______________________ (Yes/No)

Where do you dispose of waste anti-freeze? ______________________

GENERAL SURVEY QUESTIONS

Are you aware of the groundwater contamination in Atlanta? __________ (Yes/No)

How concerned are you about the contamination?

a. ☐ very concerned
b. ☐ a little concerned
c. ☐ not concerned
d. ☐ could care less

Do you feel you have been kept well informed about the problem ______ (Yes/No)

If your water was found to be contaminated, would you:

a. ☐ continue to drink it
b. ☐ use the water for bathing and washing only
c. ☐ not use the water at all

What would your answer be for the above question if the odds of being harmed by the contamination were:

1000:1 against it? ________

10,000:1 against it? ________

If your water is tested, would you want to know the results, good or bad?
____ (Yes/No)

If there was a collection site in the township where you could dispose of chemicals such as gasoline, oils, solvents, paints and thinners, for free, would you take advantage of it? ____________________ (Yes/No)

If yes, would you still do so if there was a small charge _________ (Yes/No)

If you knew that dumping certain household products down your septic system or disposing of them in your backyard or at the curb could contaminate your water or your neighbor's water, would you do it anyway? ___________ (Yes/No)

Do you think there should be an ordinance against individuals dumping harmful wastes on their own property? ____________________ (Yes/No)

Do you think there should be an ordinance against dumping harmful wastes anywhere in the township? ____________________ (Yes/No)

Do you know of any past or present activities by individuals or businesses which might have caused chemicals, gasoline or other wastes to enter the ground in Atlanta? ________________________________(Yes/No)

If yes, please explain: ________________________________

____

Do you feel Atlanta is in need of a public water system that would serve everyone? ________________________________ (Yes/No)

If there is a public water supply developed for Atlanta, would you hook up to it? ________________________________ (Yes/No)

How much do you feel you are willing to pay per month for water service if a system went in? $6, $8, $10, $12, $14, $16, $18, $20, $25 (Circle one).

ATLANTA GROUNDWATER CONTAMINATION

RESIDENTIAL SURVEY - RESULTS

Number of residents per household:

Section	1	2	3	4	Combined
Responses	40	26	10	13	89
Total people	94	62	29	39	224
per household	2.3	2.4	2.9	3.0	2.5

DRINKING WATER SUPPLY

Age of water wells:

Section	1	2	3	4	Combined
Responses	27	16	9	7	59
Avg. age	20 yrs.	14 yrs.	14 yrs.	14 yrs.	18 yrs.
Range	1-40 yrs.	1-45 yrs.		2-23 yrs.	1-45 yrs.

Depth of water wells:

Section	1	2	3	4	Combined
Responses	26	16	7	10	53
Avg. depth	33 ft.	41 ft.	45 ft.	33 ft.	36.8 ft.
Range	20-108 ft.	12-87 ft.		20-97 ft.	

Any taste or odor problems?

Section	1	2	3	4	Combined
Responses	36	26	11	12	85
yes/%	17/47%	5/19%	3/27%	3/25%	28/33%
no/%	19/53%	21/81%	8/73%	9/75%	57/67%

Has your water been tested?

Section	1	2	3	4	Combined
Responses	35	21	11	11	78
yes/%	30/85%	2/29%	3/27%	9/82%	48/61%
no/%	5/15%	15/71%	8/73%	2/18%	30/39%

Have you continued to drink your water since the Health Department warning one year ago?

Section	1	2	3	4	Combined
Responses	37	22	11	11	81
yes/%	28/75%	21/95%	11/100%	10/91%	70/86%
no/%	9/25%	1/5%	0/0%	1/9%	11/14%

ON SITE WASTEWATER DISPOSAL

What is the size of your septic tank?

Section	1	2	3	4	Combined
Responses	20	13	5	8	46
Avg. size	660 gals.	820 gals.	870 gals.	770 gals.	750 gals.
Range	250-1000	300-1000		500-1000	

Age of septic systems:

Section	1	2	3	4	Combined
Responses	25	13	5	10	53
Avg. age	16.4 yrs.	15 yrs.	8.8 yrs.	4.9 yrs.	13.2 yrs.
Range	2-40 yrs.	2-45 yrs.		1-11 yrs.	

When was the last time your tank was pumped?

Section	1	2	3	4	Combined
Responses	21	9	9	8	47
never/%	10/48%	3/33%	6/66%	4/50%	
0-3 yrs.					23/49%
3-10 yrs.					

HOME HEATING OIL

Do you heat with fuel oil?

Section	1	2	3	4	Combined
Responses	35	23	11	13	
yes/%	24/69%	10/43%	6/55%	7/54%	47/57%
no/%	11/31%	13/57%	5/45%	6/46%	35/43%

Have you ever noticed any leaks or spills?

Section	1	2	3	4	Combined
Responses	24	10	6	7	47
yes/%	4/17%	0/0%	1/16%	0/0%	5/11%
no/%	20/83%	10/100%	5/84%	7/100%	42/89%

CONSUMER PRODUCT USAGE/DISPOSAL

Do you use paint or varnish removers?

Section	1	2	3	4	Combined
Responses	36	23	10	12	81
yes/%	10/28%	4/17%	1/10%	1/8%	16/20%
no/%	26/72%	19/83%	9/90%	11/92%	65/80%

If yes, where are they disposed of?

Methods:	Landfill	5	1		1	7
	burn	5				5
	yard	1	3			4
	evaporation			1		1

Do you use a laundry degreaser?

Section	1	2	3	4	Combined
Responses	34	22	10	13	79
yes/%	14/41%	12/55%	4/40%	6/46%	36/46%
no/%	20/59%	10/45%	6/60%	7/54%	43/54%

Do you do laundry at home or at laundromat?

Section	1	2	3	4	Combined
Response					
home/%					
laundromat/%					

Do you ever use solvents or thinners?

Section	1	2	3	4	Combined
Responses	35	23	9	11	78
yes/%	5/14%	1/4%	0/0%	2/18%	8/10%
no/%	30/86%	22/96%	9/100%	9/82%	70/90%

Do you use pesticides, herbicides or insecticides?

Section	1	2	3	4	Combined
Responses	35	23	10	12	
yes/%	4/11%	3/13%	2/20%	4/33%	13/16%
no/%	31/89%	20/87%	8/80%	8/66%	67/84%

Where do you dispose of waste gasoline or kerosene?

Section	1	2	3	4	Combined
Response	31	23	9		
Disposal Methods:					
burn	3		2		
landfill	3	1			
yard	2	1			
gas station	1				
Have none:	21	21	7		

Do you change your own motor oil?

Section	1	2	3	4	Combined
Responses	35	23	10	10	78
yes/%	16/46%	7/30%	5/50%	4/40%	32/41%
no/%	19/54%	16/70%	5/50%	6/60%	46/59%

Where do you dispose of the waste oil?

Section	1	2	3	4	Combined
Disposal Method:					
burn	5		2	1	8
landfill	2	1	1		4
yard	4	4			10
gas station	1				1
reuse	2		1	1	4
give away	2				2
road			1	1	2

Do you change your own antifreeze?

Section	1	2	3	4	Combined
Responses	35	23	10	10	78
yes/%	5/15%	1/4%	1/10%	1/10%	8/10%
no/%	30/85%	22/96%	9/90%	9/90%	70/90%

Where do you dispose of the waste antifreeze?

Section	1	2	3	4	Combined
Disposal Method:					
reuse	1				1
yard	1	1		1	3
give away	1				1
landfill	2				2

GENERAL SURVEY QUESTIONS

Are you aware of the contamination problem in Atlanta?

Section	1	2	3	4	Combined
Responses	39	23	11	13	86
yes/%	37/95%	23/100%	9/82%	13/100%	82/95%
no/%	2/5%	0/0%	2/18%	0/0%	4/5%

How concerned are you about the problem?

Section	1	2	3	4	Combined
very concerned	20/51%	12/52%	4/36%	7/54%	43/50%
little concerned	12/31%	8/35%	3/27%	5/38%	28/33%
not concerned	3/8%	1/4%	3/27%	1/8%	8/9%
could care less	4/10%	2/9%	1/10%	0/0%	7/8%

Have you been kept well informed of the problem?

Section	1	2	3	4	Combined
Responses	38	23	11	11	83
yes/%	21/55%	11/48%	6/55%	7/63%	45/54%
no/%	17/45%	12/52%	5/45%	4/37%	38/46%

If your water were found to be contaminated would you...?

Section	1	2	3	4	Combined
a. Continue to drink it?	1/3%	1/5%	0/0%	1/8%	3/4%
b. Use it for washing & bathing only?	27/73%	11/50%	11/100%	6/50%	55/67%
c. Discontinue any use?	9/24%	10/45%	0/0%	5/42%	24/29%

If your water is sampled do you want to know the results--good or bad?

Section	1	2	3	4	Combined
Responses	37	22	10	13	82
yes/%	37/100%	22/100%	9/90%	13/100%	81/99%
no/%	0/0%	0/0%	1/10%	0/0%	1/1%

If there were a collection site in the township where you could dispose of chemicals such as gasoline, oils, solvents, paints and thinners, for free, would you take advantage of it?

Section	1	2	3	4	Combined
Responses	34	22	9	12	77
yes/%	27/79%	20/91%	1/77%	10/83%	64/83%
no/%	7/21%	2/9%	2/23%	2/17%	13/77%

Would you use it if there were a small charge?

Section	1	2	3	4	Combined
Responses	31	22	7	11	71
yes/%	19/61%	19/86%	6/86%	7/63%	51/72%
no/%	12/39%	3/14%	1/14%	4/37%	20/18%

If you knew that dumping certain household products down your septic system or disposing of them in your backyard or at the curb could contaminate your water or your neighbor's water, would you do it anyway?

Section	1	2	3	4	Combined
Responses	39	22	9	12	82
yes/%	0/0%	0/0%	0/0%	0/0%	0/0%
no/%	39/100%	22/100%	9/100%	12/100%	82/100%

Do you think there should be an ordinance against individuals dumping harmful wastes on their own property?

Section	1	2	3	4	Combined
Responses	38	22	9	12	81
yes/%	31/82%	21/95%	8/88%	10/88%	70/86%
no/%	7/18%	1/5%	1/12%	2/17%	11/14%

Do you think there should be an ordinance against dumping harmful wastes anywhere in the Township?

Section	1	2	3	4	Combined
Responses	37	22	9	12	80
yes/%	32/86%	20/91%	8/88%	11/92%	71/89%
no/%	5/14%	2/9%	1/12%	1/8%	9/11%

Do you know of any past or present activities by individuals or businesses which might have caused chemicals, gasoline or other wastes to enter the ground in Atlanta?

Section	1	2	3	4	Combined
Responses	38	23	9	12	82
yes/%	9/24%	5/22%	1/11%	1/8%	16/20%
no/%	29/76%	18/78%	8/89%	11/92%	66/80%

Do you feel Atlanta is in need of a public water system that would serve everyone?

Section	1	2	3	4	Combined
Responses	36	22	9	10	77
yes/%	33/92%	18/82%	5/55%	7/70%	63/82%
no/%	3/8%	4/18%	4/45%	3/30%	14/18%

If a system is developed would you hook into it?

Section	1	2	3	4	Combined
Responses	35	20	10	11	76
yes/%	28/80%	11/55%	4/40%	8/72%	51/67%
no/%	7/20%	9/45%	6/60%	3/28%	25/33%

How much would you be willing to pay per month for water service?

Section	1	2	3	4	Combined
$6.00	11	5		5	21/49%
$8.00	4	1		1	6/14%
$10.00	9	5			14/33%
$12.00				1	1/2%
$25.00	1			1	1/2%

APPENDIX E

ATLANTA COMMERCIAL SURVEY

ATLANTA GROUNDWATER CONTAMINATION
COMMERCIAL SURVEY

To provide some basic and necessary information for the development of a preventative groundwater management strategy for Atlanta, a survey of some commercial establishments was made. The survey included businesses that handle, store, or sell materials that, if released to the environment, could cause contamination of the groundwater. This includes gas stations, hardware stores, light industrial shops, repair shops, and any other business whose activities could be even a potential threat to groundwater quality. The information collected gives a picture of past and present activities that are of concern and points out some of the difficulties in protecting the groundwater from contamination.

One type of information requested in the survey concerns the management history of the business and the years at the location of the present owner. It was found that residence time ranged from a few weeks to more than 25 years, with the average for 14 respondents at less than seven years. While complete information on past management turnover was not available, it became evident that several businesses have changed ownership many times (as many as 10 previous owners in one case), and that in several cases, a change in ownership resulted in a different business at the same location. This situation, in which multiple changes in ownership and business activity have occurred over the years, results in a certain discontinuity and loss of important information regarding water and wastewater systems and past activities concerning hazardous wastes, as well as maintenance of systems and property which may affect the groundwater.

For example, although seven of 13 respondents complained that their water was bad, only four of 11 answering a follow-up question knew the age or depth of their water well. Six of 11 owners did not know the age of their wastewater system, several did not know if the system used a drainfield or a drywell, and many did not know the location of the system. Eight of 10 respondents had not pumped their septic tank since assuming ownership, this time period ranging from two to 19 years. This lack of current and accurate information regarding placement, age, and condition of wastewater systems and water wells, and their relative placement creates a situation in which protection of the groundwater and public health becomes a more difficult and uncertain task.

The commercial survey also revealed several known or alleged instances in which hazardous materials were either intentionally or unintentionally released to the environment sometime in the past. Five individuals recalled stories of leaky tanks at two or more gas stations in Atlanta, and one current owner recalled a suspected leak in one of his tanks over a period of several months a few years ago. There were two reports of gas stations draining motor oil onto the ground or allowing it to leak from barrels. It was reported that in one case a previous owner of a particular business disposed of large quantities of oil into the septic system; and in another case a previous owner discharged chemical wastes of undetermined content into the septic system. One individual described an instance of a spill from overfilling a fuel oil tank.

While at present there appears to be no blatant discharge of hazardous wastes to the environment, certain conditions were found that may be of concern. Of six businesses that service vehicles, four have floor drains that lead to drywells, and two have drains that lead to unknown locations. These drains receive floor wash wastewater and (at least in one case) radiator waste fluid. There is always the possibility that other liquids could be wasted down these drains as well. Waste oil is generally stored in barrels and sold or given away for reuse. It was found that other hazardous wastes are used in limited quantities and are disposed of by burning or evaporation, or are taken to a landfill.

As part of the commercial survey, information was collected on buried tanks containing flammable liquids. Nine locations in Atlanta were identified as having a total of at least 29 buried tanks, either presently or in the recent past. The ages and condition of the tanks vary greatly. Some tanks are 20 years old; some are sitting empty, or are filled with water; some were replaced in recent years; and in one case, four tanks at one site were tested for leaks one year ago. The sizes range from 275 gallons to 10,000 gallons. Much of this information has been passed down from previous owners over the years, and there is some uncertainty in some cases as to the age and condition of some of the tanks. Inventory methods, which are useful in identifying fuel loss due to leaky tanks, vary among owners. It was reported that generally, fuel is metered into and out of the tanks. In some cases, owners "stick" their tanks daily as an inventory method. One respondent indicated that this method was accurate to within approximately 50 gallons. In the case where the distributor owns the fuel until it is retailed at the pump, the distributor maintains the inventory. In some cases, the owner maintains records and keeps a monthly balance, sometimes in conjunction with sticking the tanks periodically.

In summary, the commercial survey revealed that some practices or incidents in the past may have caused contaimination of the groundwater. Except for gas stations, current businesses handle very small quantities of hazardous materials. Not all fuel tank owners use very precise methods for stored fuel inventories. Finally, business activity and ownership in Atlanta have changed often over the years, leaving in doubt information about the age and/or location and/or condition of water systems, wastewater systems, and underground fuel tanks.

APPENDIX F

STATE OF MICHIGAN GROUNDWATER RULES

DEPARTMENT OF NATURAL RESOURCES

WATER RESOURCES COMMISSION

GENERAL RULES

Filed with Secretary of State on AUG 14 1980
These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the water resources commission by sections 2 and 5 of Act No. 245 of the Public Acts of 1929, as amended, being §§323.2 and 323.5 of the Michigan Compiled Laws)

The General Rules of the water resources commission are amended by adding R 323.2201 to R 323.2211 to read as follows:

PART 22. GROUND WATER QUALITY

R 323.2201. Purpose; scope.

Rule 2201. (1) The purpose of the ground water quality rules is to protect the public health and welfare and to maintain the quality of ground waters in all usable aquifers for individual, public, industrial, and agricultural water supplies.

(2) These rules provide for the nondegradation of ground water quality in usable aquifers, define the requirements for hydrogeological study before permitting a discharge into ground waters, establish ground water monitoring requirements for new and existing ground water discharges, and establish a procedure for obtaining variances from these rules.

R 323.2202. Definitions; A to N.

Rule 2202. As used in this part:

(a) "Act" means Act No. 245 of the Public Acts of 1929, as amended, being §323.1 et seq. of the Michigan Compiled Laws.

(b) "Aquifer" means underground water-bearing earth materials through which ground water moves in sufficient quantity to serve as a source of water supply.

(c) "Aquifer system" means a single aquifer or a series of interconnected aquifers of local or regional extent.

(d) "Change in ground water quality" means a true difference in ground water quality at a site that is considered by the commission to be a true difference, from one point in time to another, after considering the seasonal and locational variation of quality within a site.

(e) "Commission" means the water resources commission.

(f) "Controlled application" means the proper application of a chemical for its intended purpose.

(g) "Degradation" means a change in ground water quality from local background ground water quality, within any portion of a usable aquifer system, which is determined by the commission to be a deterioration in terms of the magnitude of the change and the importance of the parameters describing ground water quality.

(h) "Deterioration" means an impairment of water quality or its value.

(i) "Diffuse source" means any facility or operation which transmits material by seepage or percolation through the soil to the ground waters.

(j) "Discharge" means the addition of materials to ground waters from any facility or operation which acts as a discrete or diffuse source and which requires a permit to discharge pursuant to the act.

(k) "Discrete source" means any facility or operation which transmits materials to the ground waters by a discernible confined conveyance.

(l) "Domestic waste" means wastes generated and discharged as a result of normal household activities.

(m) "Existing ground water quality" means concentrations of the physical, biological, chemical, and radiological parameters representative of the ground water quality in usable aquifers at a site at the time of permit issuance, permit renewal, or nonpermitted discharge as determined by the hydrogeological study required by rule 2207.

(n) "Ground water" means underground water within the zone of saturation.

(o) "Hazardous material" means those substances that, singly or in combination, pose an unacceptable, existing, or potential risk to human health or to the environment because they may be flammable, explosive, reactive, corrosive, toxic, radioactive, infectious, carcinogenic, bioconcentrative, persistent, or irritating when present in sufficient concentrations.

(p) "Hydrogeological determination" means the collection, interpretation, and presentation of hydrologic and geologic data to provide an adequate understanding of existing conditions and to determine the potential impact on the ground waters of a discharge from an operation or activity.

(q) "Industrial waste" means waste from industrial or manufacturing processes, or from a trade or business, as distinct from domestic or sanitary waste.

(r) "Local background ground water quality" means concentrations of the physical, biological, chemical, and radiological parameters representative of the ground water quality in usable aquifers at a site having virtually no influence by discharges as determined by the hydrogeological study required by rule 2207.

(s) "Monitoring well" means a well that is specifically designed to measure the impact of a discharge on the ground waters.

(t) "Non-contact cooling water" means water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product, or finished product.

R 323.2203. Definitions; O to W.

Rule 2203. As used in this part:

(a) "Observation well" means a well that is specifically designed to determine existing hydrogeological conditions.

(b) "Parameters" means those specific characteristics describing the physical, chemical, biological, and radiological conditions of the ground water quality.

(c) "Person" means an individual, partnership, association, corporation, industry, municipality, state agency, or interstate body.

(d) "Radioactive materials" means natural or synthetic materials which give off particles or rays, or both, from nuclear reactions whereby the particles or rays pose an unacceptable, existing, or potential risk to human health or to the environment.

(e) "Sanitary waste" means treated or untreated wastes that contain human metabolic wastes and domestic wastes.

(f) "Sludge" means concentrated residues generated or produced by industrial activities or by the treatment of industrial or sanitary wastes.

(g) "Solid waste" means refuse, garbage, rubbish, ashes, or other materials in solid form.

(h) "Toxic material" means a substance that is or may become harmful to plant life, animal life, or to food chains when the substance is present in sufficient concentrations or combinations.

(i) "Usable aquifer" means an aquifer, or that portion of an aquifer or aquifer system, that is capable of providing water in sufficient quantity and of satisfactory quality, as determined from the hydrogeological study required by rule 2207, to serve 1 or more protected uses. Usable aquifers do not include aquifers used for mineral, oil, or gas production, as regulated by Act No. 315 of the Public Acts of 1969, as amended, being §319.211 et seq. of the Michigan Compiled Laws, and known as the mineral well act, and Act No. 61 of the Public Acts of 1939, as amended, being §319.1 et seq. of the Michigan Compiled Laws, the act which regulates oil and gas in Michigan.

(j) "Well" means a properly designed and constructed hydraulic structure that permits measurement or withdrawal of ground water from an aquifer.

R 323.2204. Protected uses.

Rule 2204. All ground waters of the state, in usable aquifers and of a quality suitable for use as individual, public, industrial, or agricultural water supply, shall be protected for these uses.

R 323.2205. Nondegradation of ground waters in usable aquifers; permissible and prohibited discharges.

Rule 2205. (1) The quality of ground waters in all usable aquifers shall not be degraded from local background ground water quality as the result of a discharge, except as provided in rule 2210.

(2) Discharges into ground waters may be made, consistent with the requirements of the act and applicable rules, if necessary measures are taken to prevent the degradation of ground waters in usable aquifers. The following are such measures;

(a) Proper waste water treatment.
(b) Proper facility site selection.
(c) Controlling the zone of saturation at the site.
(d) Providing percolation and seepage barriers.
(e) Use of underdrainage.
(f) Containment of the discharge within the boundaries of the operation or activity defined by the hydrogeological study required by rule 2207.

(3) Materials at concentrations that exceed the maximum contaminant levels for inorganic and organic chemicals specified in the national interim primary drinking water regulations, 40 C.F.R. §§141.11 and 141.12, which are promulgated pursuant to the safe drinking water act 42 U.S.C. §300f, shall not be discharged into ground waters in usable aquifers even in those cases where the local background ground water levels for these materials exceed the specified levels.

R 323.2206. Regulation of discharges.

Rule 2206. A person shall not discharge into the ground waters any substance that is, or may become, injurious to the public health, safety, or welfare, or to the domestic, commercial, industrial, agricultural, recreational, or other uses which are being or may be made of the ground waters. Discharges into ground waters of the state are regulated by permits issued in accordance with sections 7(1) and 8(b) of the act.

R 323.2207. Determination of existing hydrogeological conditions; report.

Rule 2207. (1) A determination of existing hydrogeological conditions or study, including existing ground water quality, shall be made in the vicinity of proposed or existing discharges.

(2) The person responsible for the discharge shall provide the hydrogeological study.

(3) At each discharge site, at least 1 hydrogeological study, or its equivalent, shall be required to develop the discharge permit.

(4) For existing permitted discharges, a hydrogeological study, or its equivalent, shall be required at the time of permit renewal when an approved or presently acceptable hydrogeological study is not available. The continued permitting of an existing discharge shall be contingent on satisfactory hydrogeological conditions at the site, as determined by the hydrogeological study. The commission shall provide sufficient time for the hydrogeological study to be developed by the person responsible for the discharge.

(5) The following are the purposes of a hydrogeological study:

(a) To establish the impact that a discharge may have on ground water contained in usable aquifers.

(b) To determine, through interpretation of available and collected data, the acceptability of discharging at the site.

(c) To determine existing ground water quality.

(d) To determine local background ground water quality.

(e) To define engineering modifications that may make the discharge acceptable.

(f) To define a proposed ground water monitoring program.

(g) To define the usable aquifers.

(h) To define the areal and vertical extent of the site earth materials that assimilate and transmit the discharge.

(6) The acceptance of a site shall be determined on the basis of the hydrogeological study and consideration of proper engineering modifications.

(7) One of the following criteria shall be considered in determining whether an aquifer is usable:

(a) Whether an aquifer is presently serving a protected use.

(b) Whether an aquifer, as defined by the hydrogeological study, can potentially serve the protected uses.

(c) Whether a well can be constructed in the aquifer meeting the requirements of part 127 of Act No. 368 of the Public Acts of 1978, as amended, beir §333.12701 et seq. of the Michigan Compiled Laws an act relating to water well drilling, and Act No. 399 of the Public Acts of 1976, as amended, being §325.1001 et seq. of the Michigan Compiled Laws and known as the safe drinking water act.

(8) Hydrogeological studies shall be prepared by or under the direction of a qualified ground water or engineering geologist or a registered professional engineer with assistance from experts in related fields, such as land surveying, environmental science, and soil science.

(9) Determination of hydrogeological conditions shall cover sufficient area to allow for a definition of the impact of the discharge on ground water in a usable aquifer. The determination shall take into account the local geology and the surface and ground water conditions, including water quality parameters specific to each site. The following minimum elements shall be required in determining the impact of the discharge on ground water in usable aquifers:

(a) The concentrations of the following water quality parameters shall be determined at each site:

(i) Specific conductance as an indication of the dissolved solids.

(ii) Determination of the concentration of the following parameters for chemical balance and indicators for comparison of water quality:

Cations	Anions
Calcium	Chloride
Sodium	Sulfate
Magnesium	Bicarbonate

(b) Additional ground water quality parameters may be required. These additional parameters shall be selected by the commission on a case-by-case basis if the parameters can be justified on the basis of any 1 of the following criteria:

(i) The parameters may cause degradation in usable aquifers and are present or likely to be present in the discharge.

(ii) The parameters can demonstrate that a discharge to a usable aquifer is occurring.

(iii) The parameters can be used to define the existing or local background ground water quality.

(c) The following categories include examples of some of the parameters that may be required in addition to the minimum parameters specified in subrule 9(a) of this rule:

(i) Industrial wastewater: chemical oxygen demand, metals, organic compounds, hazardous and toxic materials.

(ii) Industrial sludge: chemical oxygen demand, metals, organic compounds, hazardous and toxic materials.

(iii) Municipal wastewater: nitrite nitrogen, nitrate nitrogen, ammonia nitrogen, total phosphorus, metals, methylene blue active substances.

(iv) Municipal sludge: nitrite nitrogen, nitrate nitrogen, ammonia nitrogen, total phosphorus, metals, methylene blue active substances.

(v) Sanitary landfills: total iron, chemical oxygen demand, nitrite nitrogen, nitrate nitrogen, ammonia nitrogen, metals, hazardous and toxic materials.

(d) A map of the site and surrounding area drawn to scale showing the distance to existing wells and the properties in the surrounding area having potential for ground water supplies; existing lakes or ponds; streams, springs, and swamps; direction of surface drainage and the direction of ground water movement in the site area; locations of borings, observation wells, and other well data used in the determination, shall be provided. Wells used in making ground water quality determinations shall be identified.

(e) Sufficient water well records. Observation wells or borings shall be required to determine the composition of subsurface earth materials in order to locate usable aquifers and to establish the degree of connection with the discharge.

(f) Sufficient data or not less than 3 observation wells shall be required to determine the ground water flow direction and possible variations plus the depth to the ground water and possible variations in depth. The top of the well casings shall be referenced to a common or United States geological survey datum.

(g) Evaluation of site earth materials shall be made to determine the ability of these earth materials to assimilate, by physical, chemical, or biological means, the various constituents of the discharge.

(h) Evaluation of the ability of the site earth materials to percolate and transmit the volume of liquids resulting from the discharge shall be made.

(i) The nature, extent, and consequence of mounding resulting from the discharge that can be anticipated to occur above the highest naturally occurring water table may be required.

(j) A description of the proposed engineering modifications that will ensure control of the discharge shall be provided for those discharges that may degrade water quality in usable aquifers.

(k) A determination of the horizontal and vertical flow system to properly determine the location and depth to be monitored, especially when mounding is superimposed on the existing system, may be required.

(l) A ground water monitoring program shall be proposed, including the design, location, and depth of monitoring wells and the methods of sampling.

(m) Compilation and interpretation of data, maps, and charts based on site conditions to support conclusions and recommendations shall be included with the study.

(10) The commission shall decide the acceptability of the hydrogeological study or its equivalent. The commission may exclude the requirements of this rule on a case-by-case basis, if the criteria, limitations, or conditions necessary to protect the usable aquifer are met.

R 323.2208. Ground water monitoring.

Rule 2208. (1) Ground water monitoring shall be required for all discharges to assist in the determination of compliance under rule 2211. Ground water monitoring shall include collection of water quality and water level data from a well or group of wells that are specifically designed to adequately assess the impact of any discharge on ground water. The design of the ground water monitoring system shall be based on the hydrogeological study; consideration of the local geology, surface water, and ground water conditions specific to each site; and the type of discharge. These factors shall determine the number of locations, number of wells at each location, and depth of each well.

(2) Monitoring wells shall be located and completed at depths as specified in the hydrogeological study so as to intercept any discharge from the site to ground water contained in a usable aquifer.

(3) Monitoring well design and construction elements shall include the following criteria:

(a) The drilling method shall be specified.

(b) Monitoring wells completed in fine-textured earth materials shall have special construction, such as gravel packing around the screen.

(c) Monitoring wells shall have suitable equipment and methods for sampling ground water, as specified in the hydrogeological study.

(d) Construction of monitoring wells shall be by a water well driller registered under Act No. 294 of the Public Acts of 1965, as amended, or a contractor regulated by Act No. 315 of the Public Acts of 1969, as amended. Monitoring well construction shall be as specified in the approved hydrogeological study.

(e) Casings shall be installed so as to prevent vertical leakage of fluids between the casing and the drill hole, and shall be capped and provided with a cap locking device. Use of a vented cap is desirable but care shall be taken to prevent introduction of contaminants through such vents.

(f) The well casing shall be protected against accidental damage and shall be adequately marked so as to be clearly visible during winter and summer conditions.

(g) Each well shall be labeled and identified by the owner's name, owner's address, the well number, the use of well, and a warning.

(h) When a monitoring well is to be permanently abandoned, approved plugging procedures shall be followed as provided in Act No. 294 of the Public Acts of 1965, as amended, or by Act No. 315 of the Public Acts of 1969, as amended.

(4) The person responsible for a discharge shall provide for the design, installation, and operation of the ground water monitoring system.

(5) The commission shall decide the acceptability of the ground water monitoring system. The commission may exclude the requirements of this rule on a case-by-case basis, if the criteria, limitations, or conditions necessary to protect the usable aquifer are met.

R 323.2209. Activities not requiring a hydrogeological report, ground water monitoring, and discharge permits.

Rule 2209. (1) The following activities do not require a permit from the commission or a hydrogeological report or ground water monitoring, except as may be required by the commission on a case-by-case basis, where such activities are or may become injurious to the protected uses of a usable aquifer:

(a) Disposal of sanitary wastes in volumes of less than 10,000 gallons per day through the use of septic tank and ground disposal systems approved by local county and district health departments that are certified by the commission.

(b) Controlled application of dust-suppressant chemicals used with normally accepted or regulated practices.

(c) Controlled application of de-icing chemicals used with normally accepted or regulated practices.

(d) Controlled chemical applications for natural resource and right-of-way programs used with normally accepted or regulated practices.

(e) Controlled application of chemicals for domestic purposes used with normally accepted or regulated practices.

(f) Controlled application of chemicals for agricultural and silvicultural use by normally accepted or regulated practices.

(g) Disposal of non-contact cooling water, not treated by the addition of chemicals, in volumes established at the discretion of the commission.

(h) Retention of storm water runoff in surface impoundments or surface waterways.

(2) Other activities may be excluded as determined by the commission on a case-by-case basis, if the criteria, limitations, or conditions that the commission deems necessary are met.

R 323.2210. Variances.

Rule 2210. (1) Variances from the requirements of rule 2205 may be granted by the commission.

(2) Variances may be granted by the commission for exceptional circumstances where it is determined by the commission that strict conformity with rule 2205 is not economically or technically feasible, that a prudent alternative does not exist, and that such variance is consistent with the promotion of the public health safety, and welfare in light of the state's paramount concern for the protection of its natural resources.

(a) A variance shall not be granted under this rule for discharges containing hazardous materials in amounts or concentrations which singly or in combination pose an unacceptable, existing, or potential risk to human health or the environment.

(b) In granting variances under this rule, the commission shall prescribe such criteria, limitations, or conditions as the commission deems necessary to protect the public health of present or future ground water users affected by the variances. Such conditions shall include preventing the degradation of ground water in other usable aquifers, prescribing treatment techniques, or providing an alternate approved water supply.

(c) All variances granted by the commission under this rule shall require a discharger or proposed discharger to the waters of the state to affirmatively demonstrate the need for a variance in terms of the criteria specified in this subrule.

(d) Before granting a variance under this rule, the commission shall provide for adequate public notice and opportunity for public hearing.

(3) Variances granted under this rule to dischargers required to be permitted by the commission pursuant to the requirements of the act shall be reviewed by the commission at the time of permit reissuance.

R 323.2211. Determination of compliance.

Rule 2211. (1) The commission shall determine compliance with these rules on the basis of all reports and information available.

(2) In making tests or analyses of water or waste to determine compliance with the rules, samples shall be collected in such a manner that the location, number, and frequency are considered satisfactory by the commission. The samples shall be preserved and analyzed pursuant to procedures outlined in 40 C.F.R. §136.1 et seq., promulgated pursuant to section 304(g) of the federal water pollution control act, as amended, 33 U.S.C. §1314, or analyzed pursuant to 40 C.F.R. §141.1 et. seq., promulgated pursuant to section 1401(1) of the safe drinking water act, 42 U.S.C. §300f which are herein adopted by reference, or pursuant to other methods prescribed or approved by the commission. Copies of 40 C.F.R. §136.1 et seq. and 40 C.F.R. §141.1 et seq. are available at a cost of $2.25 from the Department of Natural Resources, P.O. Box 30028, Lansing, MI 48909, and from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.